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**SATURN SA-6 POSTFLIGHT TRAJECTORY (U)**

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TECHNICAL MEMORANDUM X - 53123

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By

Gerald R. Riddle and Robert H. Benson

17031  
(U) ABSTRACT  
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This report presents the postflight trajectory for the Saturn SA-6 test flight. Trajectory dependent parameters are given in earth-fixed, space-fixed, and geographic coordinate systems. A complete time history of the powered flight trajectory is presented at 1.0 sec intervals from first motion through insertion. Tables of insertion conditions and various orbital parameters are included in a discussion of the orbital portion of flight. A comparison between nominal and actual trajectory dependent parameters is also presented.

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**(U) LIST OF SYMBOLS**

<b>Symbol</b>	<b>Definition</b>
<b>LATITUDE</b>	<b>Geodetic Latitude</b>
<b>EARTH VEL</b>	<b>Magnitude of Earth-Fixed Velocity Vector</b>
<b>VEL ELEV (<math>\epsilon</math>)</b>	<b>Elevation of the Earth-Fixed Velocity Vector Referenced to Local Horizontal</b>
<b>VEL AZ (<math>\alpha</math>)</b>	<b>Azimuth of the Earth-Fixed Velocity Vector Measured From North</b>
<b>SPACE VEL</b>	<b>Magnitude of Space-Fixed Velocity Vector</b>
<b>IECO, OECO, S-IV CO</b>	<b>Inboard, Outboard, and S-IV Engine Cutoff, Respectively</b>
<b>PITCH ANGLE</b>	<b>Angle From Local Geocentric Vertical to Earth-Fixed Velocity Vector</b>

**GEORGE C. MARSHALL SPACE FLIGHT CENTER**

**SATURN SA-6 POSTFLIGHT TRAJECTORY (U)**

By

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**(U) SUMMARY**

Because of the premature loss of engine 8 and the below nominal performance of the S-I stage, the S-IV stage operated on a renovated trajectory attempting to obtain the desired conditions to achieve orbit. Total velocity was 33.2 m/s lower than nominal at engine 8 shutdown and 99.2 m/s lower than nominal at OECO. At S-IV CO the velocity deficit was more than replenished; at cutoff the velocity was 3.2 m/s greater than nominal. At S-IV CO the actual altitude was 2.4 km below nominal and the range was 41.7 km shorter than nominal. A cross range ( $Z_E$ ) deviation of 0.3 km to the left of nominal built up during the S-I powered portion of flight; however, the closed-loop guidance system during S-IV burn had eliminated this deviation at the termination of S-IV operation. Because of an undetermined guidance error, the cross range velocity was 3.5 m/s to the right of nominal at S-IV CO.

A theoretical free-flight trajectory of the separated S-I booster indicates that the impact ground range, relative to the launch site, was 58.5 km shorter than nominal. Impact, assuming the booster remained intact, should have occurred between 519.3 and 627.8 sec, depending on the re-entry attitude.

The S-IV payload at orbital insertion had a space-fixed velocity 5.9 m/s greater than nominal; 3.0 m/s due to accepted guidance errors known prior to flight and 2.9 m/s due to S-IV thrust decay. Orbital elements include a perigee altitude of 183.3 km, and an apogee altitude of 239.7 km. These conditions indicate an expected lifetime of 3.3 days, 1.5 days less than nominal. An estimated breakup altitude of 86 km at approximately 00:27 ZULU, June 1, at coordinates of 19.9 deg N latitude and 167.2 E longitude, was obtained for the re-entry phase.

[REDACTED]

The theoretical ballistic impact time is approximately 00:39 ZULU, June 1 at coordinates of 13.6 deg N latitude and 179.0 deg E longitude.

## 1.0 (U) INTRODUCTION

The SA-6 Saturn vehicle was launched from Cape Kennedy on May 28, 1964, at 12:07:00 Eastern Standard Time. Approximately 10 min and 35 sec after launch, the S-IV stage with instrument unit and Apollo boilerplate was inserted into orbit.

SA-6 was the second flight test of the Saturn I, Block II vehicle, which includes an active S-IV stage. This was the first flight test with an unmanned boilerplate Apollo spacecraft, BP-13. In addition, this was the first flight test with the adaptive guidance in closed loop during the S-IV powered flight phase.

This report presents the postflight mass point trajectory in tabular form from first motion to insertion in Tables VII through XI. Also presented are detailed discussions of data sources and their utilization, estimated accuracies of the trajectory, and a comparisor of actual and nominal trajectory parameters. A table of insertion conditions and various orbital parameters is included in the discussion of the orbital portion of flight. An analysis of the various orbital tracking networks is also presented.

All times listed in the tables are referenced to Range Zero (12:07:00 EST), unless otherwise noted. The time of first motion was defined as occurring 0.17 sec after Range Zero.

Acknowledgement is given to the Data Reduction Branch of the Computation Laboratory for their efforts in the preparation of the tabulated trajectory data and to the General Electric Trajectories Programming Unit for programmer support in orbit determination.

## 2.0 (U) COORDINATE SYSTEMS AND TRAJECTORY PARAMETERS

The translational motion of the vehicle's center of gravity is described in several coordinate systems. An initial displacement of 32.2 m locates the center of gravity in the coordinate system whose origin lies on the reference ellipsoid. Definitions of the coordinate systems are found in the Appendix.

[REDACTED]

The Fischer Ellipsoid was used to represent the earth and its gravitational field. Launch pad coordinates are defined with respect to the ellipsoid.

The geographical coordinates and gravity data for Launch Pad 37B at Cape Kennedy are:

Geodetic Latitude:	28.531854°N
Longitude	80.564953°W
Gravity:	9.818 m/sec <sup>2</sup>

Elevations above the reference ellipsoid are:

Base of launch pedestal:	4.9 m
C. G. at first motion:	32.2 m
Launch Azimuth:	90° E of N.
Flight Azimuth:	105° E of N.
ST-90S Platform Azimuth:	105.000° E of N.
ST-124 Platform Azimuth:	104.9992° E of N.

### 3.0 (U) POWERED FLIGHT TRAJECTORY ANALYSIS

#### 3.1 Data Sources

The tracking data available through the powered portion of flight are summarized in Figure 1 and itemized in Table I. The relation between the SA-6 flight path and the various tracking sites is shown in Figure 2.

The quality of the data, in general, was fair. The downrange radars at G. B. I.(3.16), San Salvador (5.16), Grand Turk (7.18), and Antigua (91.18) experienced large random errors and abrupt data shifts. These abrupt shifts cause large portions of data to be unreliable; consequently, the data were not very useful in establishing the trajectory. The majority of the random error can be attributed to the angle measurements (azimuth and elevation). An exemplification is the G. B. I. (3.16) radar data up to approximately 400 sec. Although the range measurement was in good agreement with the reference trajectory, the elevation angle was very erratic and inconsistent.

Also contributing to the unreliability of the downrange radars is the large amount of inconsistency between their results. This is made apparent in the comparisons shown in Figures 5 through 7. RCA, Air Force Eastern Test Range, has indicated that there are timing errors in some of the FPQ-6 radar data. It has been reported by them that the Patrick AFB radar (0.18) has a 50 milli sec timing error in the range measurement and a 35 milli sec error in the angle measurement. A 35 milli sec timing error for the range and angle measurements on all other FPQ-6/TPQ-18 radars is also indicated.

Other possibilities believed to have contributed to the unreliability of the data are a voltage breakdown of the on-board antennae and cross polarization problems. The voltage breakdown is believed to be the cause of the large shift in the Grand Turk (7.18) radar data at 480 sec. G. B. I. (3.16) radar lost lock at 480 sec and did not reacquire. Both radars were operating on the I. U. beacon and the San Salvador (5.16) radar, which did not experience any difficulties at 480 sec, was operating on the spacecraft beacon. The voltage breakdown, being a function of pressure altitude, occurred at a similar time on SA-5. One refinement to be made that will help eliminate the problem is to improve the cable connectors. It is believed that the installation of circular polarized ground antenna's will help alleviate the problem of cross polarization.

### 3.1.1 Antenna Locations

Figure 3 shows the location of the antenna for the various tracking systems and the vehicle center of gravity versus time. The tracking data used in establishing the trajectory were transferred to the vehicle center of gravity to provide a common reference point for all of the tracking systems.

### 3.1.2 MISTRAM

Missile Trajectory Measurement (MISTRAM) System tracking data were received during the following intervals:

<u>Range Time (sec)</u>	<u>Source</u>
38.15 to 148.65	Valkaria
155.15 to 296.15	
311.75 to 577.85	Eleuthera

Reliable data were obtained up to approximately 500 sec. The random error was estimated to be less than 5 m. According to RCA, Air Force Eastern Test Range, the uncertainty of the MISTRAM data at 500 sec is 100 m in position and 2.5 m/s in velocity. Comparisons between MISTRAM and the reference trajectory are presented in Figures 5 through 7.

### 3.1.3 GLOTRAC

SA-6 was the first Saturn vehicle to be tracked by the Global Tracking (GLOTRAC) System. Reliable data were obtained from 183.2 to 508.0 sec. The GLOTRAC system provides trajectory data based on a minimum variance estimation process. Velocity data were derived from range rate difference measurements. These range rate data were obtained from a GLOTRAC measuring system located at Antigua, Bermuda, Grand Turk, San Salvador, and a van near Mark II Azusa site. Positions were determined from the range rate data by an integration process utilizing range measurements from Mark II Azusa, Cape Kennedy (1.16) radar, G. B. I. (3.16) radar, and San Salvador (5.16) radar. The random error of the data was relatively small, approximately 2 to 5 m. According to RCA, Air Force Eastern Test Range, the uncertainty of the GLOTRAC data at 500 sec is 50 to 100 m in position and 0.5 to 1.0 m/s in velocity. Comparisons between GLOTRAC and the reference trajectory are included in Figures 5 through 7.

### 3.1.4 Radar Altimeter

The third engineering test flight of the radar altimeter produced data of higher quality than on the preceding flights. Valid data were obtained during the following intervals:

<u>Time interval (sec)</u>
139 to 149
160 to 218
260 to 350
463 to 646.5

The altimeter data were reduced on the basis of reliable signal strength. The reliability signal deteriorated after 646.5 sec because of vehicle roll and tumble. The cause of the various dropout areas are not known at the present time.

The altimeter data are compared with the reference trajectory altitude in Figure 4. Included in the Figure are altitude comparisons as computed from the various tracking data. Although the radar altimeter output is shown in detail, only the general trend of the altitudes as computed from the various tracking data is presented to facilitate the comparison. The altimeter measures altitude directly by a range only. Therefore, its data should be more accurate than the altitude data computed from the measured parameters of the external tracking radar systems which rely on angle measurements.

The random error of the altimeter data is approximately 25 m. The average difference between the altimeter and the reference trajectory ranges from approximately 150 m at 160 sec to approximately 80 m at 630 sec. The difference between the altimeter and MISTRAM ranges from approximately 90 m at 320 sec to 40 meters at 510 sec. Fundamental calculations indicate these differences could be attributed to a timing error of 0.09 sec and a bias of 50 to 100 m in the altimeter output. Preflight settings and calibrations could possibly contribute to the bias.

Various improvements, such as an increase in sensitivity, contributed to the acquisition of more consistent data on SA-6. Some additional improvements being made are 1) to make the system more stable, hence, less affected by environmental conditions, 2) to increase the sensitivity of the system, and 3) to improve the timing reference. The altimeter time on all future flights will be referenced to liftoff signal; on all previous flights the altimeter time had no particular reference. The increase in sensitivity augments the range measuring capability; hence, reliable data should be obtained at much higher altitudes. Another possibility being considered to increase the range measuring capability of the system is to increase the power supply; however, this would necessitate the installation of a larger antenna.

The altimeter data proved very helpful in the determination of consistent tracking data during the S-IV portion of flight. It is expected that the altimeter information will be an integral part of trajectory construction for future flights. Efforts are being expended to obtain the desirable reduction programs necessary to provide usable altimeter data.

### 3.1.5 Patrick (0.18) Radar (FPQ-6)

The 0.18 radar system was programmed to track the discarded S-I booster after separation. Reliable tracking data were acquired until 380 sec range time. Before separation, the 0.18 radar differed

with the reference trajectory by less than 100 m (see Figures 5 through 7 for a comparison of various tracking data with the reference trajectory) in position data and less than 2 m/s in velocity data.

### 3.2 Data Utilization

External tracking data and telemetered guidance data were used to establish the postflight trajectory as presented in Tables VII through XI. The trajectory, as presented, was constructed in the following manner.

0.0 - 19.0 sec:

Regular Fixed Camera and ODOP data were used in a least squares curve fit. The differences between the resulting curve fit and the actual data were negligible. (Reference 2 discusses in detail the least squares program used to establish this portion of the trajectory.)

19.0 - 70.0 sec:

ODOP data processed by a smoothing and differentiation program (see the following paragraphs for more discussion on the smoothing and differentiation program.)

70.0 - 112.0 sec:

Azusa data processed by the smoothing and differentiation program.

112.0 - 149.0 sec:

Azusa position data processed by the smoothing and differentiation program. Telemetered guidance data were used to determine the velocity and acceleration components' profile.

149.0 - 634.86 sec:

A computed trajectory based on telemetered guidance velocity data, available tracking data, and the orbital insertion point. (See the following paragraphs for more discussion on the computed trajectory.)

Since the trajectory was constructed from several different data sources, it was necessary to provide for a merging or blending process to compensate for small biases that existed between data from the various sources. A merging program was used to connect the data from the different sources without creating a sharp transient. This was accomplished by utilizing a least squares technique.

Telemetered guidance velocity data, in conjunction with available external tracking data and the orbital insertion point, were used to construct the trajectory during the interval from 149.0 to 634.86 sec. An actual error model for the ST-124 guidance platform was used to correct the telemetered velocities for the known pre-flight guidance errors. These corrected velocities were integrated, transformed and compared with tracking data and the insertion point. It was necessary to add the velocity gained between first motion and guidance computer release to the corrected velocities. Also an additional adjustment was required in the lateral velocity to match tracking and the insertion point.

Since the downrange radars experience large random and cyclic errors, the conventional least square smoothing technique was revised. Desirable results were obtained when fourth degree coefficients were averaged with second degree coefficients covering a twenty sec interval (i.e., 101 points at a data rate of 0.2 sec or 201 points at a date rate of 0.1 sec, etc). The amplitude of data oscillating at approximately 0.1 cps was reduced 90% with less than 0.1 m bias being induced. The frequency response curve of the coefficients is shown in Figure 8. These averaged coefficients were used to smooth the position data. However, fourth degree least square coefficients covering the same time interval were used to obtain velocity and acceleration data because the averaged coefficients would induce significant bias errors in the derivatives of position data during particular phases of the trajectory. A more detailed discussion of the smoothing technique can be found in Reference 3.

ODOP and Azusa data were smoothed using least square coefficients covering a 10 sec interval. It was determined that the 10 sec interval would be sufficient because ODOP and Azusa systems did not experience significant cyclic errors.

### 3.2 First Motion Time

Pad measurements 32-B01 and 32-B02 (Displacement at Stub Fins I and III) and vehicle displacement as measured from camera data were available for the determination of first motion time. The first motion time indicated by each measurement is given in the following table.

<u>Measurement</u>	<u>Range Time (sec)</u>
32-B01 and 32-B02	0.17
Camera Data	0.19

The decision was made by the Flight Evaluation Working Group to use pad measurements for the determination of first motion time on SA-6 and all subsequent flights.

### 3.3 Error Analysis of Reference Trajectory

During the S-I powered portion of flight, good coverage was provided by the 1.16 radar, ODOP, and Azusa tracking systems. The ODOP and Azusa data were used to establish the majority of the reference trajectory over this time. The available tracking data covering the later portion of S-IV powered flight were not satisfactory; therefore, telemetered guidance velocity data in conjunction with tracking data and the orbital insertion point were used to construct the trajectory during the interval from 149.0 to 634.86 sec. Data from the various tracking sources are compared with the reference trajectory in Figures 5 through 7. All data were smoothed and transferred from the point of track (beacon location) to a common point, the vehicle center of gravity. These curves show only the trend of the data relative to the reference trajectory; however, the shifts that occurred in the data are made readily apparent in these curves.

The dispersion of the various data gives an indication of the validity of the reference trajectory. The maximum difference between the 1.16 radar, ODOP, and Azusa tracking systems from 50 to 150 sec was less than 30 m in the Y-component, 40 m in the X-component and 15 m in the Z-component. The majority of this deviation is attributed to the radar data. Fairly large deviations are present for the time after 150 sec.

An estimate of the probable total uncertainty in the reference trajectory is shown in Figure 9. At OECO the position components are probably accurate to 20 m and the velocity components to 0.3 m/s. By S-IV CO the maximum uncertainties increase to about 0.7 m/s in the velocity components. The uncertainties in position components are about 175 m in X and 120 m in Y and Z.

A comparison of several parameters at insertion from the trajectory established using powered flight ascent tracking and telemetered guidance with those from orbital tracking is shown below.

<u>Parameter</u>	<u>Postflight Reference</u>	<u>Reference Minus Orbit Determination</u>
Vector Distance from Launch		
Site (km)	2154.40	-0.03
Ground Range (km)	2126.17	-0.07
Altitude (km)	182.81	0.05
Earth-Fixed Velocity (m/s)	7407.6	0.0
XE (km)	146.36	-0.03
YE (km) Position Components	-178.40	0.06
ZE (km)	52.33	0.16
DXE (m/s)	6997.4	0.1
DYE (m/s) Velocity Components	-2420.1	0.0
DZE (m/s)	230.4	-0.1

The position and velocity components are in the earth-fixed plumline coordinate system. For comparison purposes, orbital data (Table IIA) were transformed from space-fixed to earth-fixed plumline coordinates. The differences shown are all within the accuracy limits of the two methods used.

#### 4.0 (C) ACTUAL AND NOMINAL POWERED TRAJECTORY

##### 4.1 Powered Flight

Table II presents the actual and nominal times of events in sequential order. Actual and nominal altitude, range and cross range

( $Z_E$ ) are compared graphically in Figure 10 for the S-I phase of flight and in Figure 11 for the S-IV phase. Actual and nominal earth-fixed total velocities are shown graphically in Figure 13. Comparisons of actual and nominal parameters at the four cutoff events are shown in Table IV. The nominal trajectory is presented in Reference 1.

Altitude and range were both less than predicted during S-I burn. The actual earth-fixed velocity was 33.2 m/s less than nominal at engine 8 shutdown and 99.2 m/s less at OECO. The velocity deficit at engine 8 shutdown has been attributed to lower than nominal performance of the S-I stage. This low performance projected out to OECO would result in a velocity deficit of 48 m/s. The loss of engine 8 at 117.28 sec caused an additional velocity loss of 40 m/s (direct effect of removing one engine thrust plus indirect effect of reducing the thrust from decreased acceleration head on the remaining engines). The remaining velocity deficit of 11.2 m/s can be attributed to the increased propellant residuals. The various contributing factors to the S-I velocity deficit are summarized in the table below.

<u>Contributing Factor</u>	<u>Velocity Deficit (m/s)</u>
1. Low S-I Performance	48
2. Engine 8 Shutdown	40
3. Increased Propellant Residuals	11.2
TOTAL	99.2

As a result of the premature shutdown of engine 8, the flow rate was lower than nominal; consequently, OECO occurred 2.99 sec later than predicted.

The longitudinal acceleration was about 1.7% lower than nominal until engine 8 shutdown. From this time until IECO the acceleration averaged 1.9% lower than a simulated "engine out" case. This increased percentage deviation is due to the thrust on the remaining seven engines being lower than nominal because of the decrease in acceleration head at the pump inlets. Actual and nominal longitudinal accelerations are shown in Figure 12.

The actual space-fixed velocity at S-IV CO signal given by the guidance computer (624.86 sec) was 7808.92 m/s, compared to a preset value of 7805.95 m/s, even though cutoff was given 1.07 sec earlier than predicted. Since the S-I stage cutoff 2.99 sec late, the S-IV stage gained 99.9 m/s more velocity (space-fixed) than nominal in 4.06 sec less burning time. This is primarily attributed to the thrust controller on engine 4, which resulted in a higher thrust than predicted

The deviation between the actual velocity at S-IV CO (7808.92 m/s) and the predicted (7805.95 m/s) was due principally to errors known prior to flight. The revised predicted velocity was made up as follows:

Guidance computer setting	7805.95 m/s
Y-accelerometer misalignment	2.76
Guidance computer programming error	0.39
Expected	7809.10 m/s

By orbital insertion (defined as S-IV CO + 10 sec) the total space-fixed velocity was 7811.9 m/s, 5.9 m/s greater than used for predicting the orbit. As indicated earlier, 3 m/s of this deviation was attributed to guidance errors known prior to flight. The remaining deviation was caused by neglecting the thrust decay in the velocity equation pre-set in the guidance computer.

The actual altitude and range were less than nominal during the entire flight. The actual apex altitude reached during S-IV burn was 8.4 km lower than predicted. However, by S-IV CO this deviation was reduced to 2.4 km. The lower apex altitude was primarily due to the velocity deficit at S-IV ignition. The altitude deviation at S-IV CO was primarily due to a 0.057 deg misalignment of the ST-124 guidance Y-accelerometer which was known prior to flight. The predicted altitude deviation due to this error was a reduction of 2.2 km at insertion.

Mach number and dynamic pressure are shown in Figure 14. These parameters were calculated using measured meteorological data to an altitude of 27.25 km. Above this altitude the 1963 Patrick Reference atmosphere was used.

A comparison of actual and nominal parameters at significant times are given in Table III. Apex is given for both the S-IV stage and the discarded S-I stage. It should be noted that loss of telemetry signal and impact apply only to the discarded S-I stage.

#### 4.1.1 Thrust Decay

The S-IV CO signal was given by the guidance computer at 624.86 sec; however, the solenoids for the propellant valves on the S-IV stage did not receive the signal until 0.022 sec later. The velocity gain from the various thrust decays is given in the table below. The value given for the S-IV stage is the cutoff impulse subsequent to the signal to the solenoids on the propellant valves.

<u>Event</u>	Velocity Gain (m/s)	
	<u>Actual</u>	<u>Nominal</u>
Engine 8 Shutdown	0.8	
IECO	4.7	6.6*
OECO	6.1	6.3
S-IV CO	2.9	1.9

\*Based on four engines

The nominal value for S-IV CO is based on a predicted main engine impulse of 7,150 lb-sec and a vent stack cutoff impulse of 500 lb-sec.

#### 4.1.2 Separation

A time history of the S-I/S-IV separation is shown in Figures 15 and 16. The physical separation of the two stages occurred when the resultant acceleration from thrust decay and retro-rockets of the S-I stage was less than the total acceleration from the ullage rockets of the S-IV stage. Telemetered longitudinal and normal acceleration data, in conjunction with telemetered attitude data, were used to obtain the relative acceleration between the two stages. This relative acceleration is determined by algebraically adding the resultant accelerations from the two stages after they have been transferred to a common coordinate system. The relative velocity and translation between the two stages were determined by integrating the relative acceleration.

Figure 15 shows the actual and nominal relative longitudinal distance between the two stages. Negative values of the separation distance indicate the S-IV stage engines are still within the interstage. The separation signal was given by the flight sequencer at 149.62 sec. The first motion between the two stages was observed at 149.75 sec and the S-IV stage cleared the S-I interstage at 150.69 sec. The two stages were separated by 7.3 m at S-IV stage ignition, which is 4.2 m greater than the minimum required clearance.

To compare actual and nominal values, the times of the nominal data were adjusted by the difference in time of actual and nominal physical separation. The nominal separation data were obtained from Reference 4.

#### 4.2 S-I Booster Trajectory After Separation

A theoretical free flight trajectory of the discarded S-I booster was generated using position and velocity data from the 0.18 radar at 175 sec. Reliable tracking was lost at approximately 380 sec. At this time the theoretical trajectory deviated from the 0.18 radar data by less than 30 m. Also included as input to the theoretical free flight trajectory were 1963 Patrick Reference atmospheric data and nominal drag coefficient data reflecting a tumbling condition of the booster.

The motion of the booster after separation could not be determined because of insufficient telemetry information. Since the attitude of the vehicle was unknown at re-entry, two additional trajectories were computed using extreme drag conditions. Nominal coefficients of drag were used assuming the booster 1) stabilized at an angle-of-attack of 90° and 2) stabilized at an angle-of-attack of 0°. These two cases would provide approximate maximum and minimum impact times, respectively. The following table shows the results of the three cases considered.

<u>Drag Condition</u>	<u>Impact Range (km)</u>	<u>Impact Time (sec)</u>
0° Angle-of-Attack	778.8	519.3
Tumbling	767.9	577.2
90° Angle-of-Attack	761.8	627.3

The theoretical free flight trajectory utilizing the tumbling drag coefficient data will be considered as the actual free flight trajectory of the booster. The impact location relative to the launch site is shown in Figure 17 and the free flight trajectory is presented in Table V. Included in Figure 17 are the recovery locations of the various camera capsules.

Preliminary impact information was also obtained from RCA, Air Force Eastern Test Range. The table following presents booster impact position as obtained from RCA Preliminary IP report, actual free flight trajectory, and nominal free flight trajectory. Actual surface range is less than nominal surface range because the actual velocity and altitude of the booster at OECO was lower than nominal due to the loss of engine 3 and low S-I performance.

### Booster Impact

Parameter	Preliminary IP Report	Actual	Nominal	Act-Nom
Surface Range *(km)	767.5	767.9	826.4	-58.5
Cross Range (km)	-	11.6	13.3	- 1.7
Geodetic Latitude (deg)	26.437	26.436	26.254	0.182
Longitude (deg)	73.163	73.157	72.607	0.550
Range Time (sec)	581.6	577.2	595.6	-18.4

\* Surface Range is measured from launch site.

To establish the actual free flight trajectory, the 0.18 radar data were numerically smoothed using least square coefficients (see Figure 8 for frequency response of coefficients). The smoothed velocities were then manually plotted so that low frequency oscillations could be removed.

## 5.0 (U) ORBITAL FLIGHT

### 5.1 Orbital Analysis

The S-IV-6 stage with Instrument Unit and an Apollo boilerplate payload was inserted into orbit on May 28, 1964, at 17:17:34.86 U.T. (634.86 sec range time). The orbital insertion conditions for SA-6 were determined by a differential correction procedure using radar beacon track data and minitrack direction cosine data listed below. In addition, the RMS error of the data residuals and the number of data observations utilized are shown.

Station	Time of Track (Universal Time)	Data Types	No. of Valid Observations	RMS Error of Residuals
Antigua (FPQ-6)	17:17:37 17:20:35 (R. T. 637-815 sec)	Azimuth Elevation Range	85 88 68	0.008° 0.026° 6 m
Pretoria, South Africa (FPS-16) (R. T. 1971-2367) (Pass 1)	17:39:51-17:46:27	Azimuth Elevation Range	137 170 166	0.018° 0.030° 11 m
Johannesburg, South Africa (Minitrack)	17:42:00-17:43:24 (R. T. 2100-2184)	CA* CB*	12 10	0.0006° 0.00035

Station	Time of Track (Universal Time)	Data Types	No. of Valid Observations	RMS Error of Residuals
Carnarvon, Australia (FPQ-6) (R. T. 3150-3546)	17:59:30-18:06:06	Azimuth	67	0.012°
		Elevation	53	0.082°
		Range	65	17 m
Pretoria, South Africa (FPS-16)**(R. T. 7686-7986) (Pass 2)	19:15:06-19:20:06	Elevation	40	0.073°
		Range	40	25 m

\* CA and CB are Minitrack direction cosines measured from a North-South and an East-West station baseline, respectively.

\*\* The Pretoria azimuth data for Pass 2 was not included in the solution because the RMS azimuth residual error was statistically incompatible with the other data.

The classical osculating two-body orbital elements and the corresponding position vector and space-fixed velocity vector at orbital insertion are shown in Table VIA. The orbital elements are referenced to the apparent equinox and equator at 0 hr U.T. the day of launch.

A comparison between some of the actual and nominal (preflight trajectory) orbital insertion parameters are shown in the following table.

	Actual	Nominal	Act-Nom
Time of Orbital Insertion (Range Time in Seconds)	634.86	635.9	-1.07
Space-Fixed Velocity (m/s)	7811.87	7805.80	6.07
Pitch Angle (deg)	89.95	89.87	0.08
Altitude (km)**	182.76	185.26	-2.50
Ground Range (km)	2126.24	2168.18	-41.94
Cross Range (km)	52.17	52.20	-0.03
Apogee Altitude (km)*	239.70	229.90	9.80
Perigee Altitude (km)*	183.29	182.15	1.14
Period (min)	88.62	88.52	0.10
Inclination (deg)	31.78	31.77	0.01
Excess Circular Velocity (m/s)	15.7	11.1	4.6
Lifetime (days)	3.3	4.8	-1.5

\* Apogee and perigee altitudes defined assuming a spherical Earth of radius 6373 km.

\*\* Altitude defined assuming an oblate Earth.

At orbital insertion the vehicle was 41.9 km less down range than the nominal and 2.5 km lower in insertion altitude, while the cross range agreed with the nominal. In spite of the lower insertion altitude, the actual perigee is in relatively good agreement with nominal. This is due to actual insertion occurring nearer to perige, than in the nominal case, as evidenced by the actual pitch angle being more nearly 90 deg. The disagreement between the nominal and the actual lifetime can be attributed primarily to the assumed atmospheric model used in the lifetime prediction. After publication of the nominal trajectory and lifetime, but prior to the SA-6 launching, the nominal lifetime was revised to 3.3 days by assuming a shift in the atmospheric model used in the lifetime prediction. This shift was extrapolated from lifetime information gained in the Gemini Titan (GT-1) flight, which had an orbit comparable to SA-6.

The RMS tracking residual errors which represent the differences between the actual tracking values and the orbit defined by the insertion conditions given in the tabulation, were from 2 to 3 times higher than the expected high-frequency errors of the measuring system employed. Included in the RMS residual errors are high frequency errors (assumed Gaussian) and systematic errors due to possible instrumentation bias, mathematical model errors and atmospheric refraction errors. The maximum RMS error of the radar residuals was 25 m in range and 0.08 deg in azimuth and elevation angles. The maximum RMS error of the Minitrack direction cosine residuals was 600 parts per million. The expected high-frequency errors of the measuring systems are 3 m in range and 0.003 deg in angles for FPQ-6 radars (design specifications), 6 m in range and 0.01 deg in angles for the FPS-16 radars (from prior experience), and 250 parts per million for the Minitrack direction cosines (as quoted by GSFC).

Insertion condition solutions were made using Antigua data at insertion, orbital data from the first two orbits, and combinations of both data sources. Solutions were obtained for all data source combinations with and without solving for drag. The maximum deviation between the solutions and the solution quoted was 1 m/s in any velocity component and 400 m in any position component for all cases considered. These maximum deviations occur when comparing the solution with Antigua data alone against all other solutions, indicating a disagreement between data sources.

Propellant venting is known to have occurred after S-IV CO. It might be postulated that the venting disturbances cause the observed disagreement between the Antigua data and orbital data solutions, but analysis has shown that the maximum net velocity differential due to orbital venting during the first two orbits should be less than 0.2 m/s.

In summary, a discrepancy does exist between the Antigua tracking at insertion and the orbital tracking. Studies are being continued to resolve this discrepancy. However, analysis to date indicates that the quoted maximum position and velocity differences of 400 m and 1 m/s between all solutions is a valid estimate of the maximum error in the position and velocity at orbital insertion given in the tabulation.

### 5.1.1 Orbit Decay and Re-Entry

The SA-6 orbiting vehicle apogee and perigee altitudes from orbital insertion to re-entry are shown in Figure 18. The orbital decay history is based upon orbital elements established by GSFC on a real time basis and upon postflight analysis performed by MSFC. It can be seen that the change in apogee and perigee altitudes for the first 2 days of vehicle lifetime is relatively linear. The initial apogee and perigee decay rates respectively were 11 km/day and 7 km/day.

The orbital tracking data which were used at MSFC for determination of the terminal decay of the SA-6 orbit and vehicle re-entry (uncontrolled) are given in the following table along with the RMS residual errors of the data. All of the data were obtained by skin track with C-band radars.

Re-Entry Tracking Summary  
May 31, 1964

Station	Acquisition Time (Universal Time)	Type of Data	No. of Observations Used	RMS Residuals Error
White Sands, New Mexico (FPS-16)	15:31:24	Azimuth	28	0.025°
		Elevation	22	0.038°
		Range	25	9 m
Patrick AFB, Florida (FPQ-6)	15:37:06	Azimuth	28	0.021°
		Elevation	31	0.093°
		Range	31	16 m

### Re-entry Tracking Summary (cont'd)

Station	Acquisition Time (Universal Time)	Type of Data	No. Of Observations Used	RMS Residual Error
White Sands, New Mexico (FPS-16)	17:04:18	Azimuth	12	0.022
		Elevation	12	0.046
		Range	12	14 m
Santiago, Chile (Minitrack)	23:28:15	(Minitrack meridian crossing)		

The maximum RMS residual errors are 16 m in range, 0.09 deg in elevation and 0.03 deg in azimuth. These RMS residual errors include systematic as well as gaussian errors and indicate the good fit of the determined trajectory to the actual tracking data. In previous use of radar skin track data (the orbiting SA-5 and GT-1 vehicles) the maximum RMS residual errors experienced were about 25 m in range and 0.05 deg in angle data. The Santiago observation was the last signal received from the orbiting vehicle.

Additional radar data later than the above have been received, but the data were either invalid or have not yet been used due to recent delivery. A report of some NORAD data during the above time period was also received, but the data themselves have not been received.

An orbit determination was made for the position and velocity vectors and effective drag utilizing the radar data listed above for an epoch of 15:00 U.T., May 31. The orbital parameters shown below were then used as initial conditions for an integration of the orbit to impact.

#### Terminal Epoch Conditions

Universal Time (hrs)	15.00
Semi-major Axis (km)	6540.434
Eccentricity	0.0002092
Inclination (deg)	31.7770
Right Ascension of Ascending Node (deg)	282.1814
Argument of Perigee (deg)	123.4448
True Anomaly (deg)	-166.7082
Sidereal Time (deg)	248.52318
Altitude From Center of Earth (km)	6541.766
Space-Fixed Velocity (m/s)	7805.104

This extrapolated orbit yields a Santiago meridian crossing time of 23:28:12.5 U.T., which is in reasonable agreement with the Santiago observation. The orbit would reach an estimated breakup altitude of 86 km at approximately 00:27 U.T., June 1, at coordinates 19.9 deg N latitude and 167.2 deg E longitude (see Figure 19). The theoretical ballistic impact time is approximately 00:39 U.T., June 1, at coordinates 13.6 deg N latitude and 179.0 deg E longitude. The re-entry location is consistent with the fact that no signal was received from the minitrack beacon after the Santiago crossing. The Canton Island station would have been expected to receive the signal had the vehicle not broken up or impacted prior to reaching the visibility limits of the station. The elevation limit for the Canton Island station (shown in Figure 19 for a 100 km vehicle altitude) is -2 deg, according to GSFC. Since the re-entry occurred near noon local time in an ocean area, the probability of any optical sightings of the re-entering object is very small.

The extrapolation of the orbit for over seven hours (five revolutions) from the last appreciable tracking involves significant assumptions and permits significant error in the estimated re-entry point. However, the good correlation of the extrapolation with the single-point Santiago observation and with the absence of any signal at Canton Island confirms that the extrapolation is essentially valid.

The integration of the orbit was performed incorporating an earth model including second, third, and fourth zonal harmonics. The effective drag shift factor, S, as determined in the 15:00 U.T. orbit determination was used in the orbit extrapolation, where S is the ratio of the observed drag to that predicted using the 1959 ARDC atmosphere and a nominal ballistic factor  $C_D A/M$  of  $0.0090 \cdot m^2/kg$ . The factor S adjusts for variations from assumed values of drag coefficients, vehicle attitude, and atmospheric density. For the 15:00 ZULU orbit determination S was 1.0725, which is consistent with earlier observations of orbit decay and with preflight expectations. Assuming that the S factor remains constant over the last five revolutions is perhaps the assumption in the extrapolation which is most subject to error.

A preliminary error analysis for the re-entry point based upon the consistency of fit to the tracking data and assuming all errors are random indicates that the  $2\sigma$  error limits are about 200 m in altitude, 0.2 m/s in velocity, and 8% in the effective drag solution. These errors are highly correlated. Propagating these errors through

the orbit extrapolation leads to  $2\sigma$  error limits for the time of break-up (86 km altitude) of 7.5 min or approximately 2400 km ground range. These limits are indicated in Figure 19. However, the true possible error limits are larger, due to systematic orbit determination error not included and due to possible variation in the assumed drag over the last five revolutions.

A theoretical ballistic impact time of 00:31 U.T., June 1 has been reported by GSFC, based on the same data described above. The reasons for the difference in solutions is not known at this time, but may easily be attributed to slightly different assumptions or refinement of data. The coordinates of this theoretical ballistic impact are 22.13 deg N latitude and 162.29 deg E longitude (see Reference 6). This impact location differs by approximately 2000 km from that obtained with the 15:00 U.T. solution, approximately the above quoted uncertainty in the solution.

Additional tracking data obtained during the terminal phase has recently been received and a full analysis of the error limits for the re-entry point will be completed at a later date.

## 5.2 Orbital Tracking Performance

Orbital tracking of the SA-6 orbiting vehicle was conducted by the NASA Space Tracking and Data Acquisition Network (STADAN), which is composed of the global network of minitrack stations, and the Manned Space Flight Network (MSFN) supported by elements of DOD, which is a global network of radar tracking stations. Additional tracking support was provided by the optical tracking network of the Smithsonian Astrophysical Observatory (SAO).

Table VIB shows the stations in the MSFN which successfully performed radar tracking and the number of passes tracked per day from the date of vehicle insertion, May 28, 1964, through the entire SA-6 orbiting vehicle lifetime. All radar tracking over the first two orbits, May 28, was radar beacon track. All other radar tracking was skin track. Very good results were obtained by GSFC using the radar skin track in a decay analysis of the orbiting vehicle.

The minitrack beacon functioned throughout the lifetime of the orbiting vehicle and the vehicle was tracked daily by STADAN. Table VIB also shows the STADAN and SAO tracking received from insertion to re-entry. The last reported minitrack tracking was by Santiago, Chile at 23:28:15 U.T. May 31, 1964, which was also the last signal received from the orbiting vehicle prior to re-entry. Only three optical observations (Baker-Nunn camera) were reported by SAO. No reported stellar magnitudes of the orbiting vehicle were received.

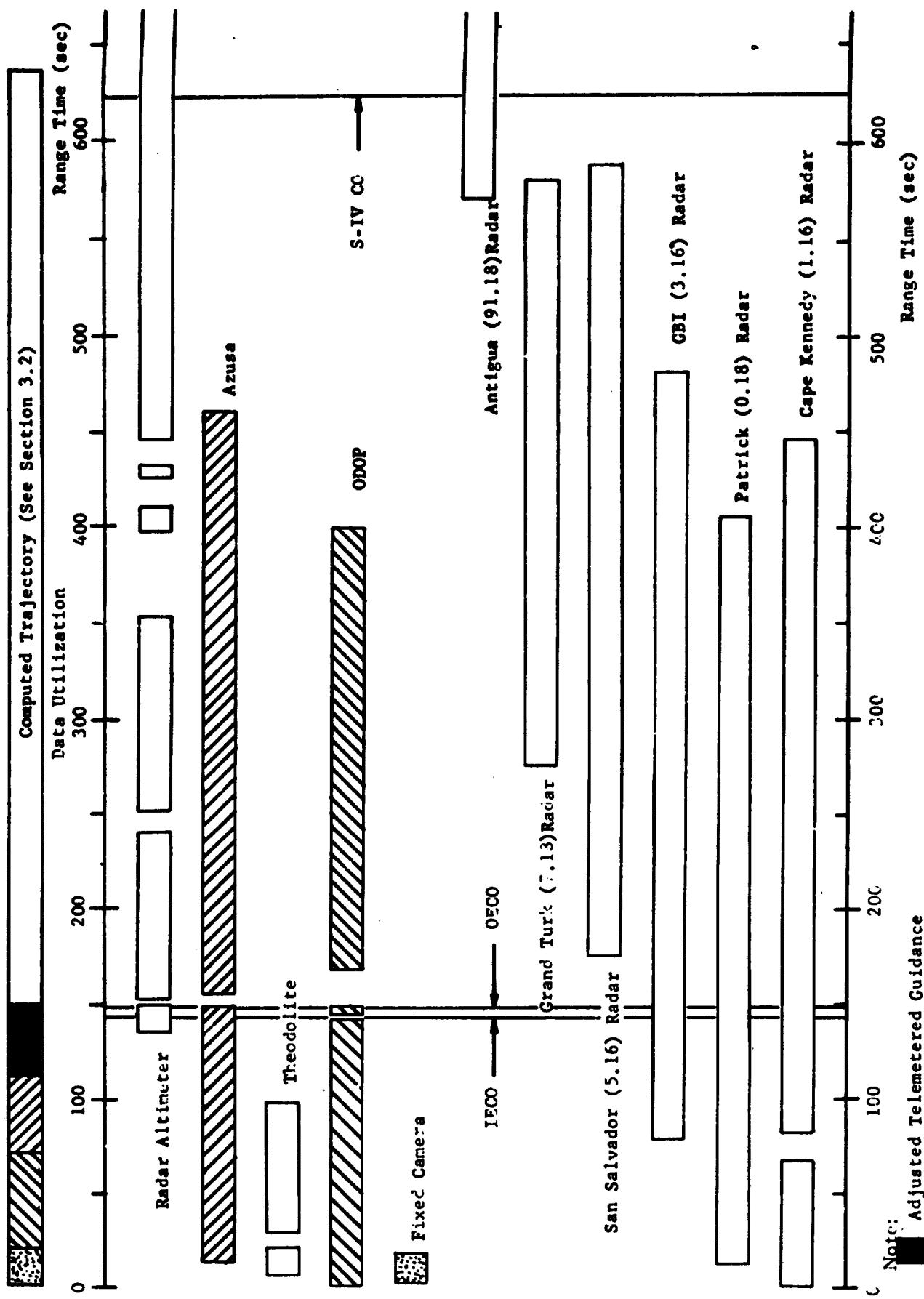


FIGURE 1 AVAILABLE TRACKING DATA

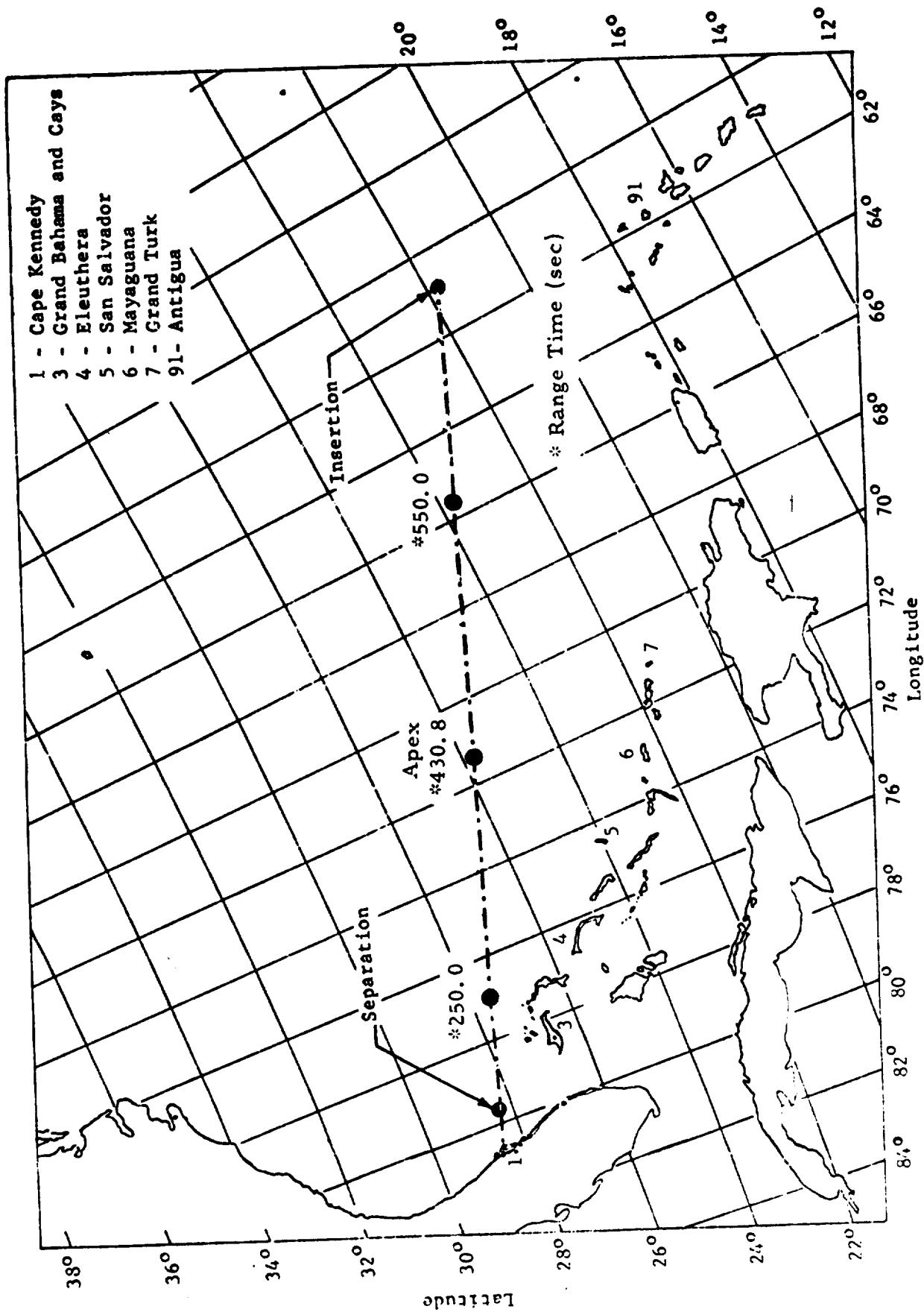
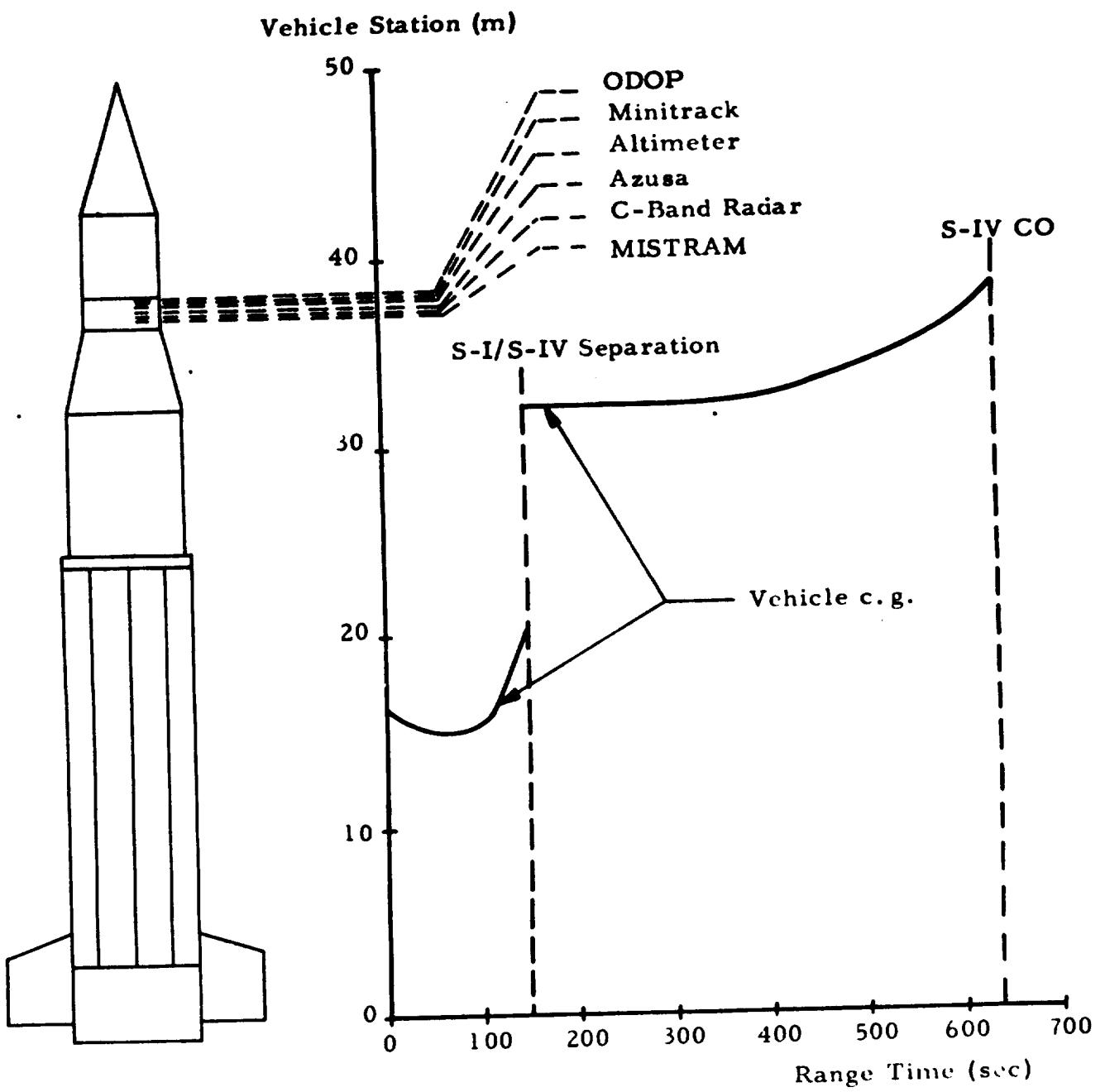


FIGURE 2 TRACKING STATIONS



**FIGURE 3 ANTENNA LOCATIONS  
AND  
VEHICLE CENTER OF GRAVITY VERSUS  
RANGE TIME**

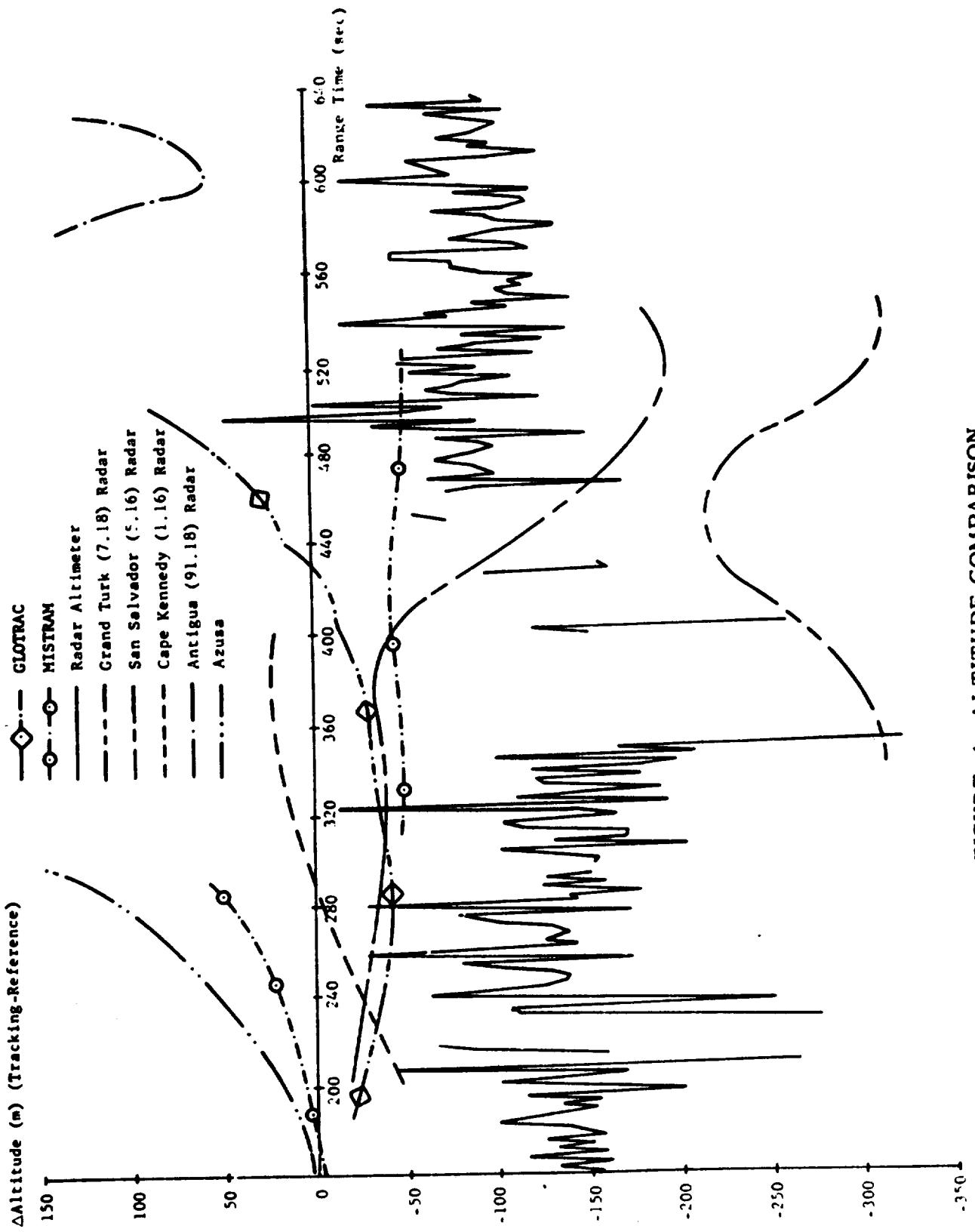


FIGURE 4 ALTITUDE COMPARISON

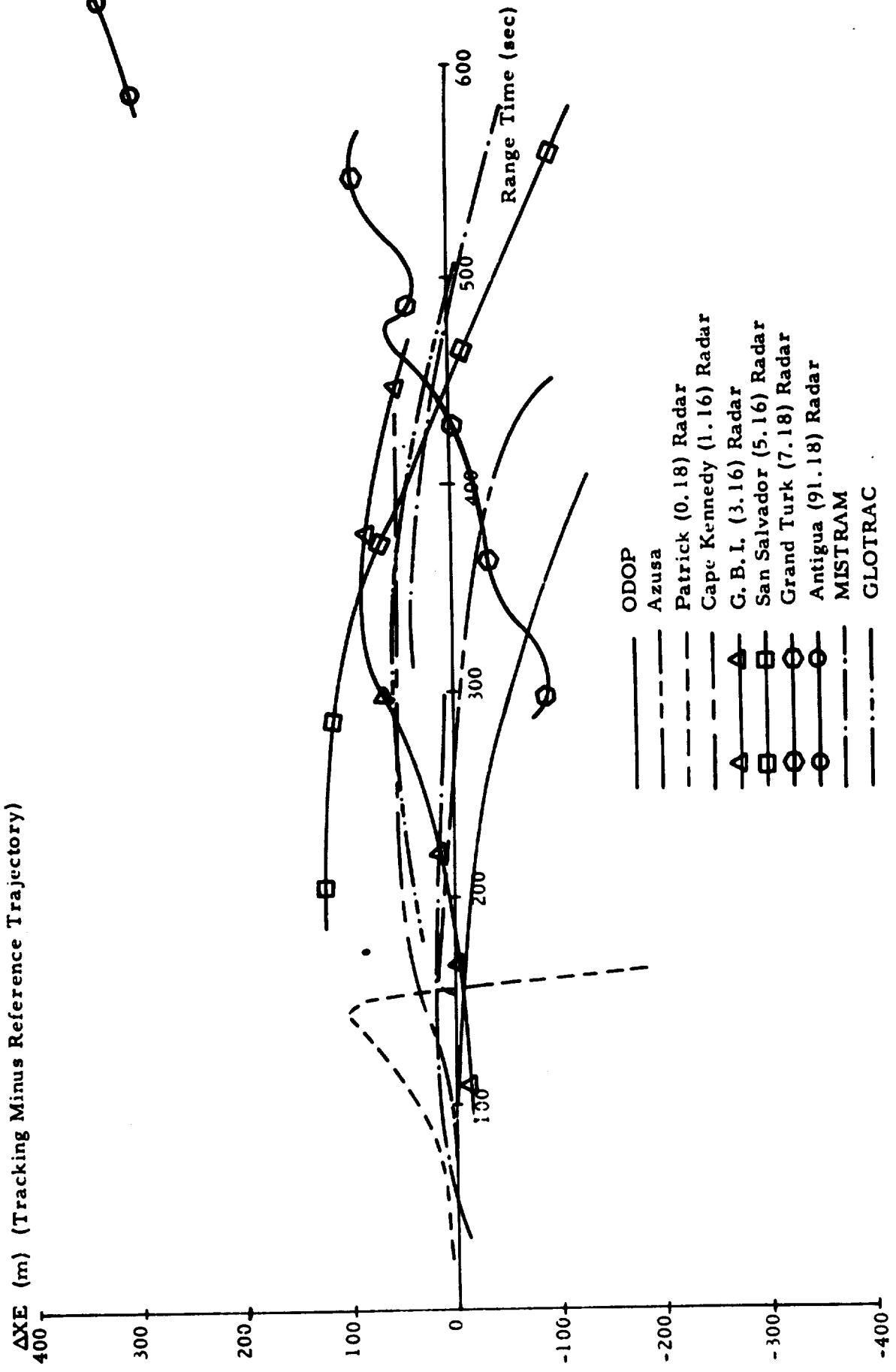


FIGURE 5 TRACKING COMPARISONS (POWERED FLIGHT)

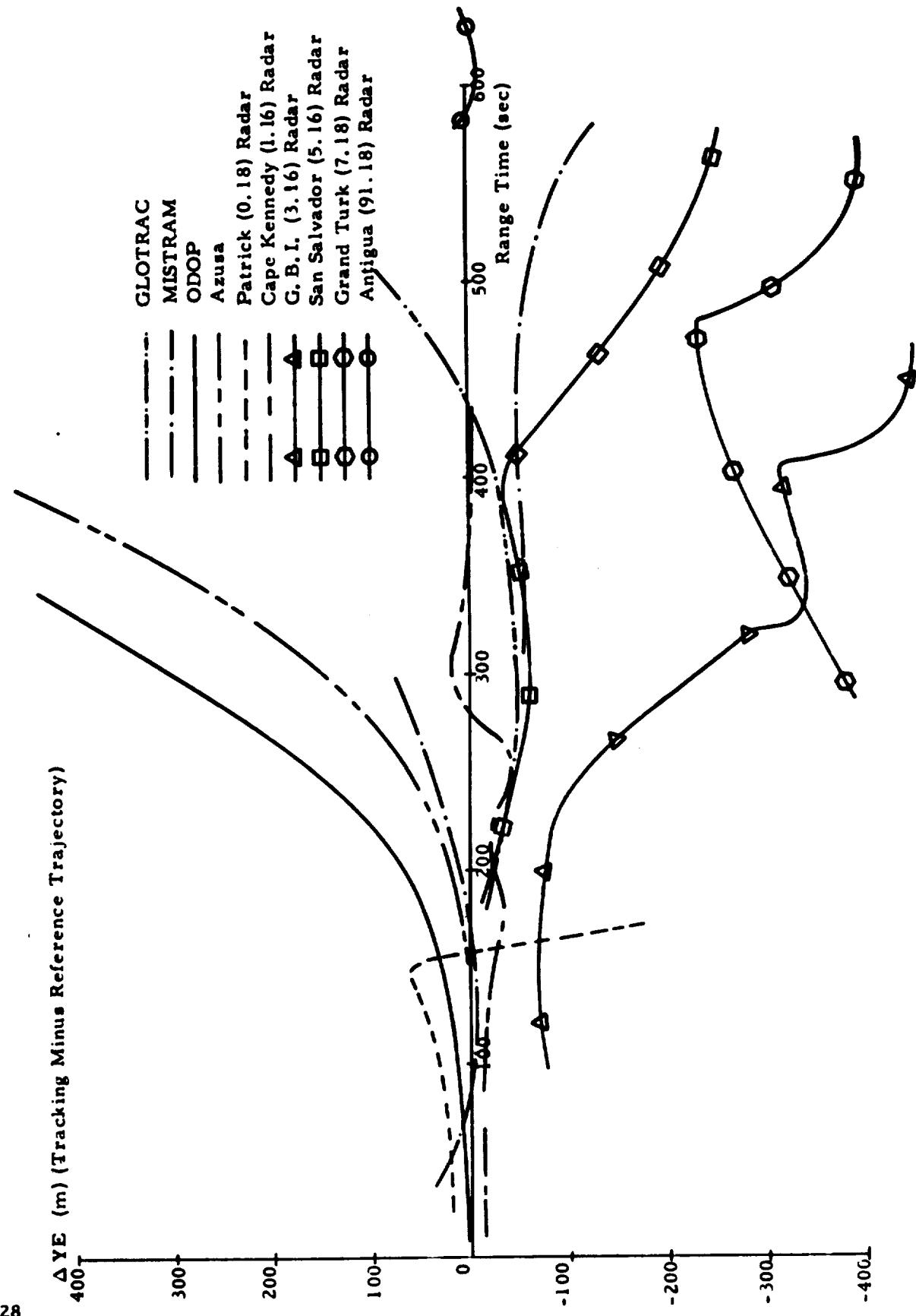


FIGURE 6 TRACKING COMPARISONS (POWERED FLIGHT)

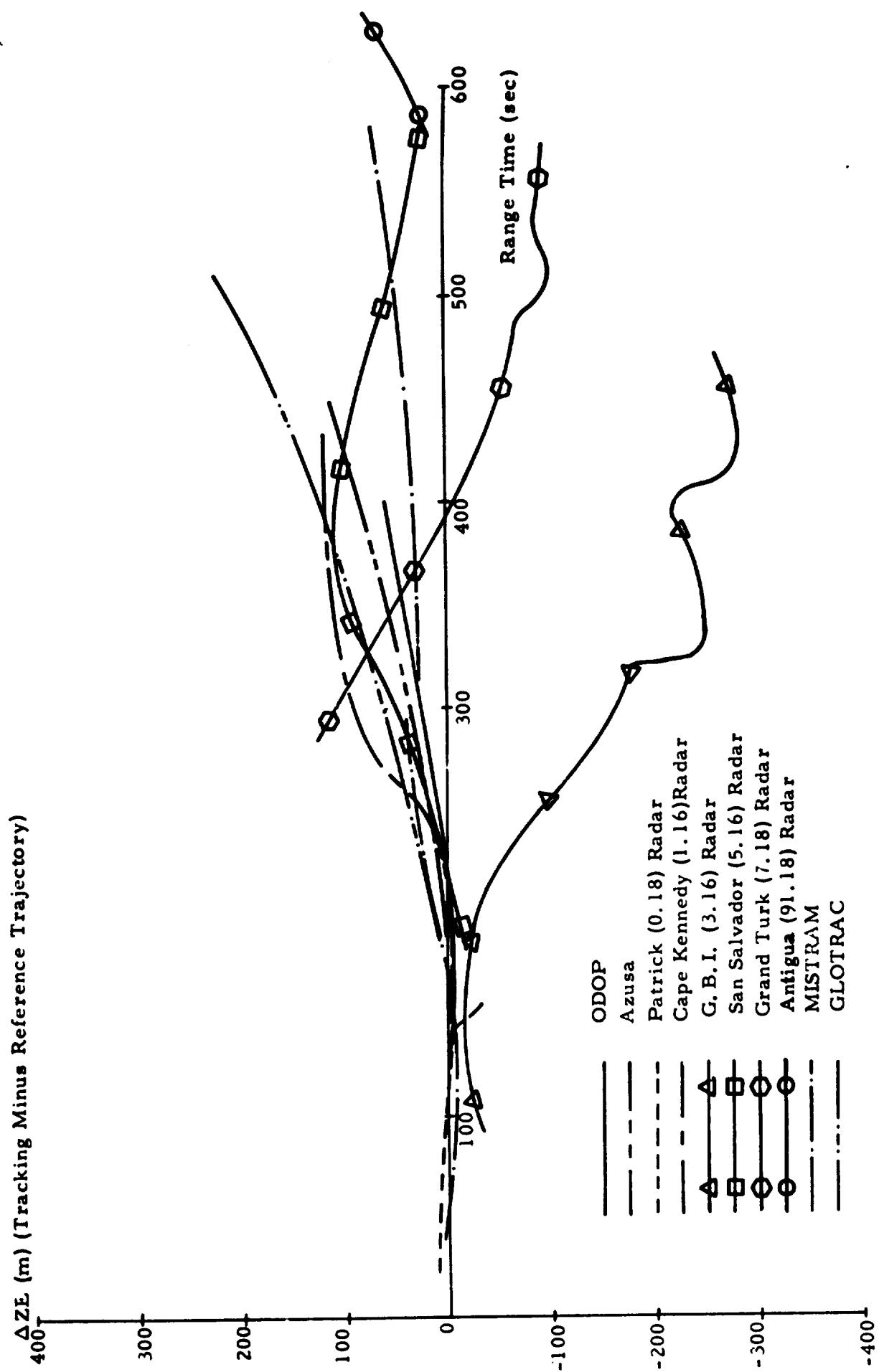


FIGURE 7 TRACKING COMPARISONS (POWERED FLIGHT)

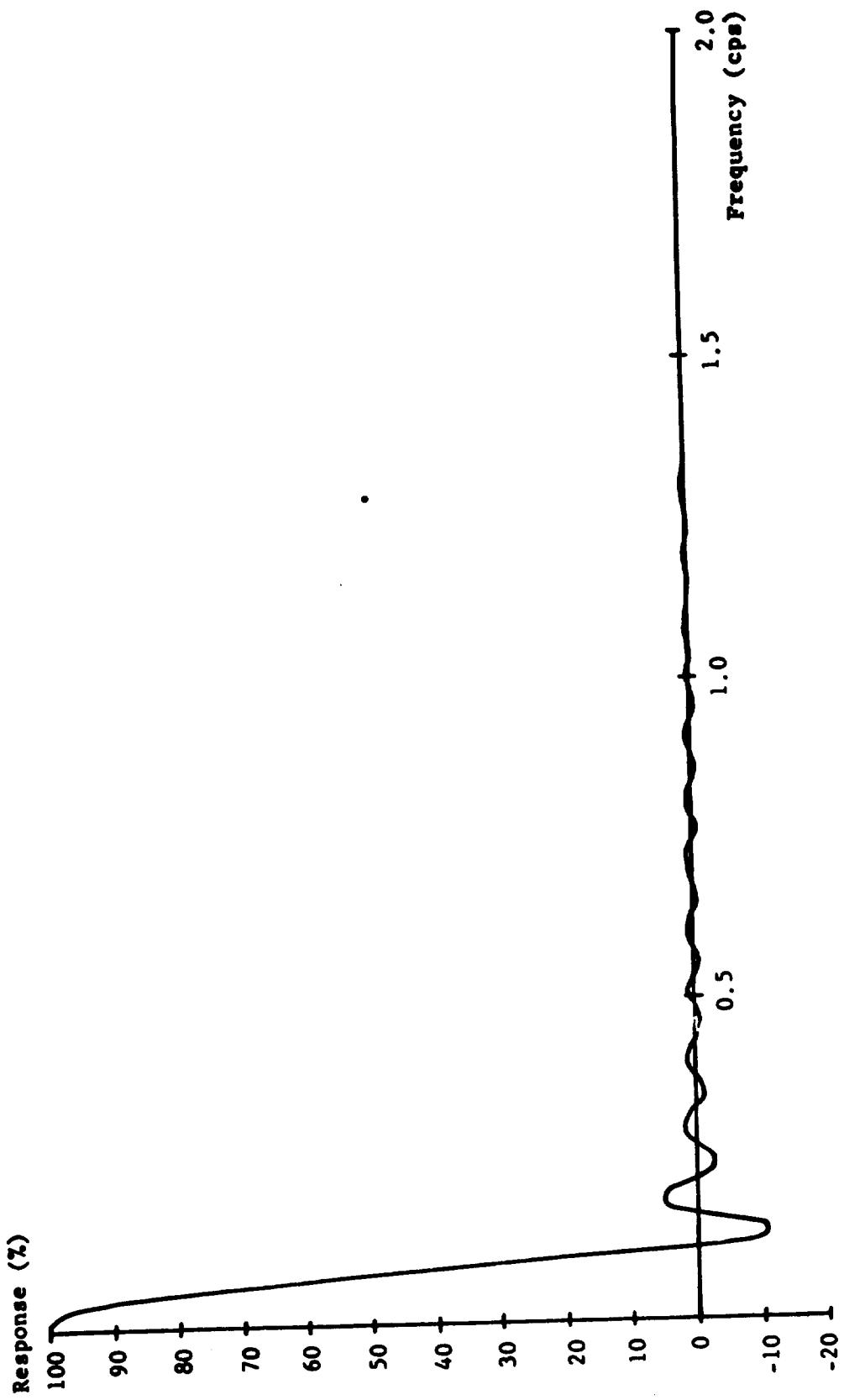
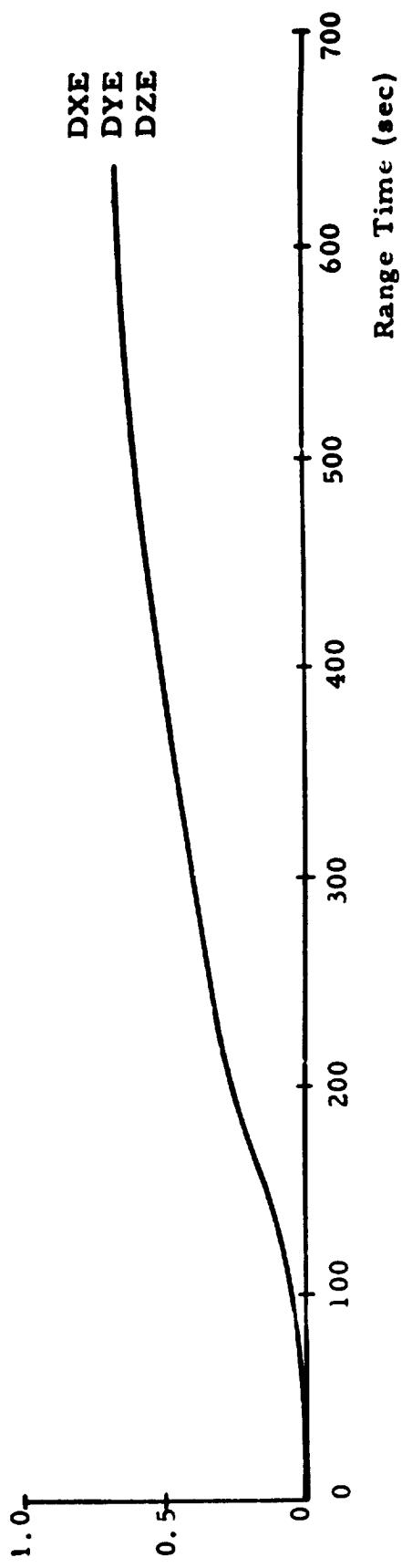


FIGURE 8 FREQUENCY RESPONSE OF SMOOTHING COEFFICIENTS

Earth-Fixed Velocity ( $\pm$  m/s)



Earth-Fixed Position ( $\pm$  m)

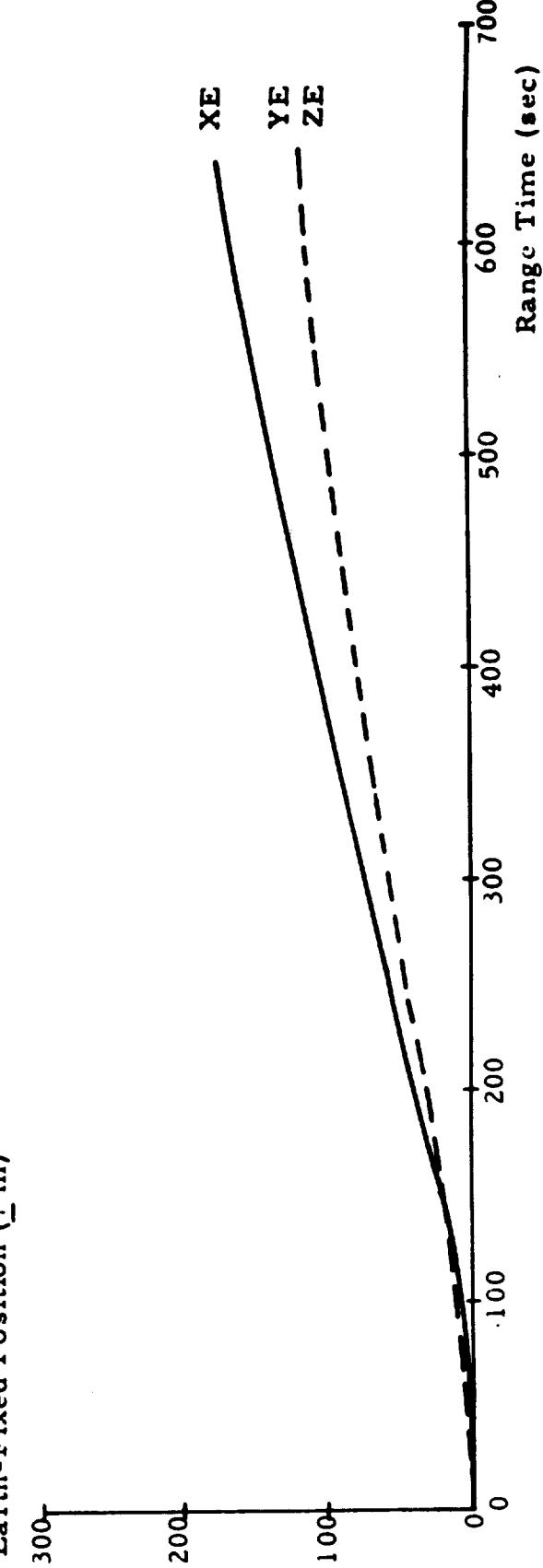


FIGURE 9 ESTIMATED UNCERTAINTY OF REFERENCE TRAJECTORY

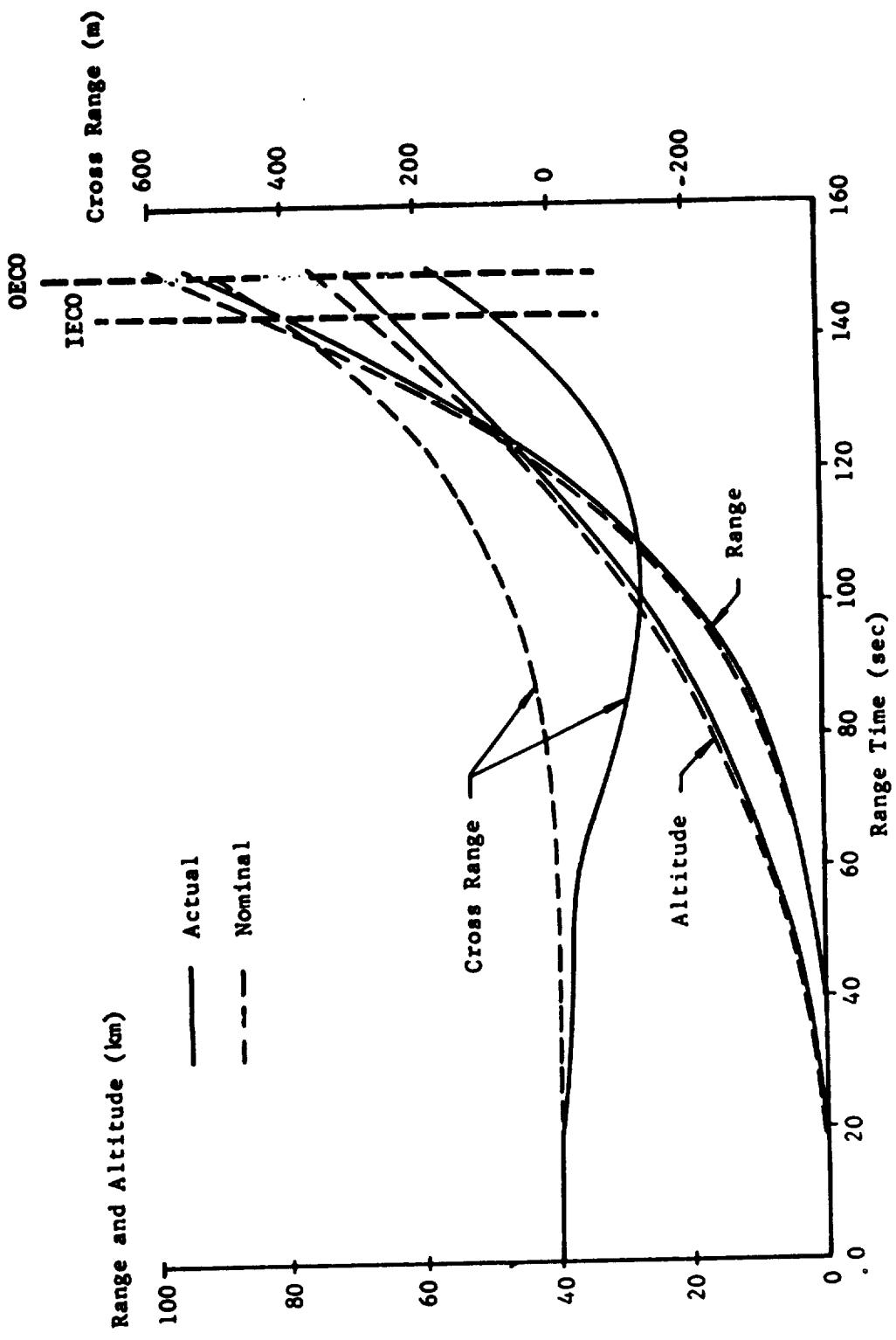


FIGURE 10 S-I TRAJECTORY

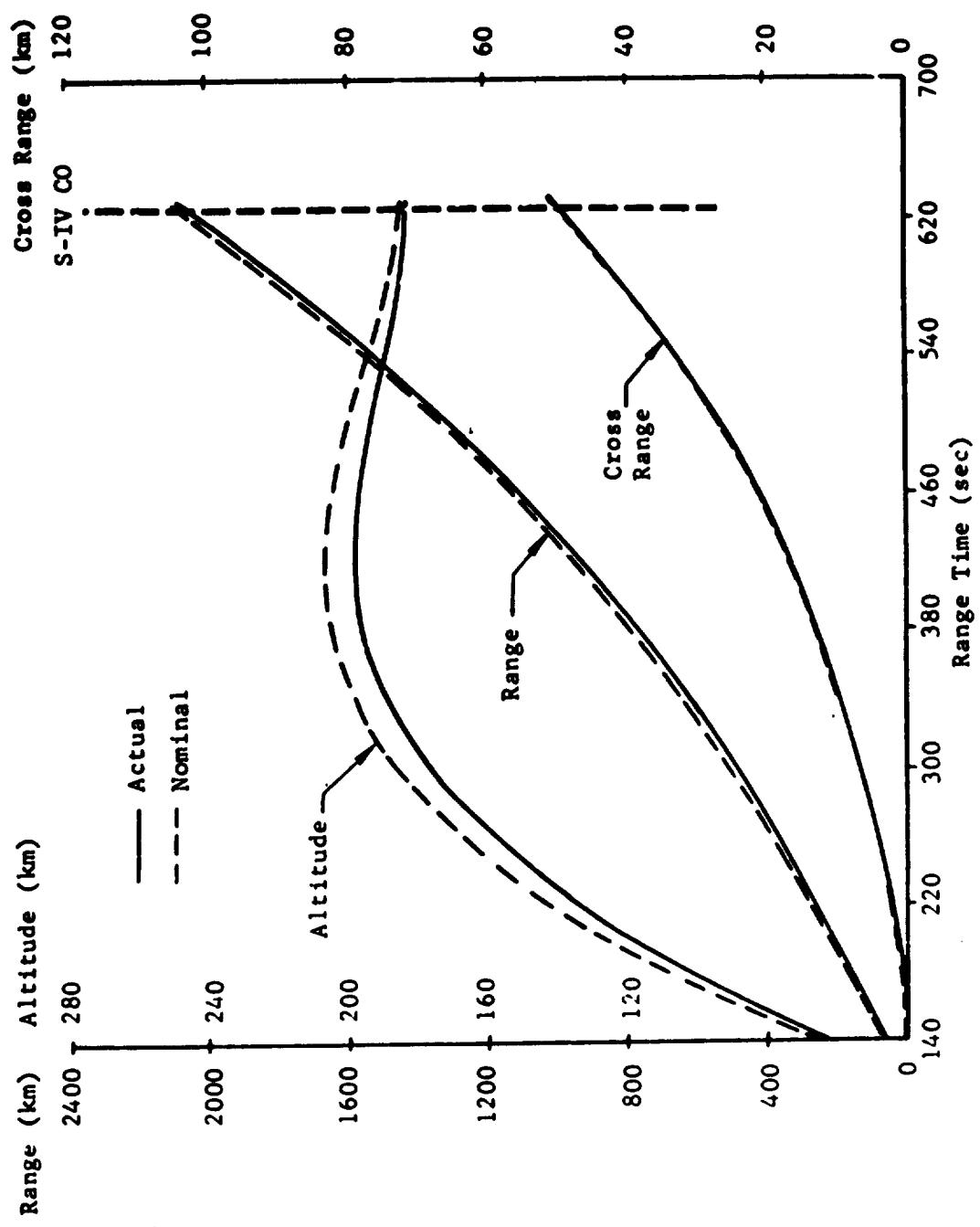


FIGURE 11 S-IV TRAJECTORY

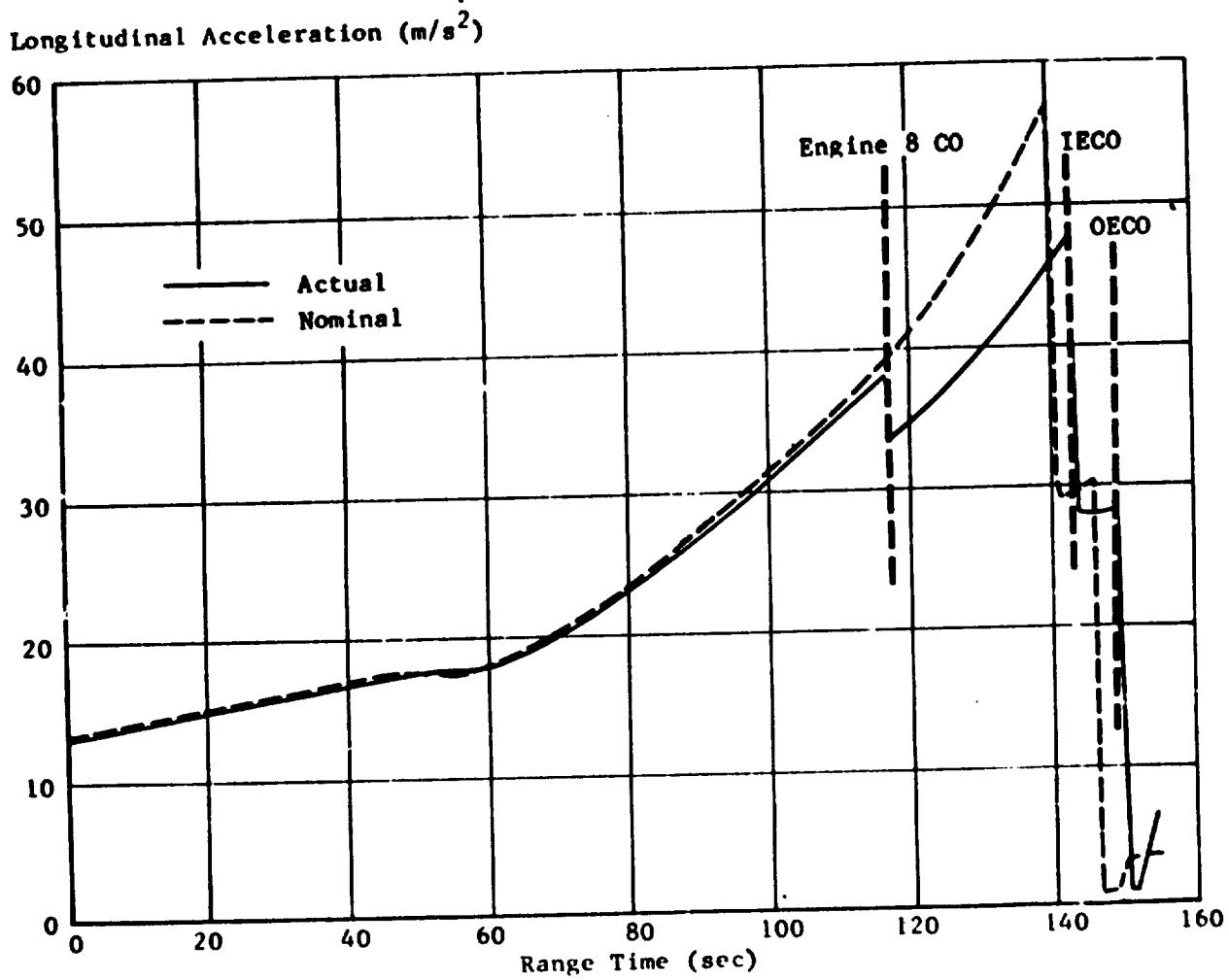
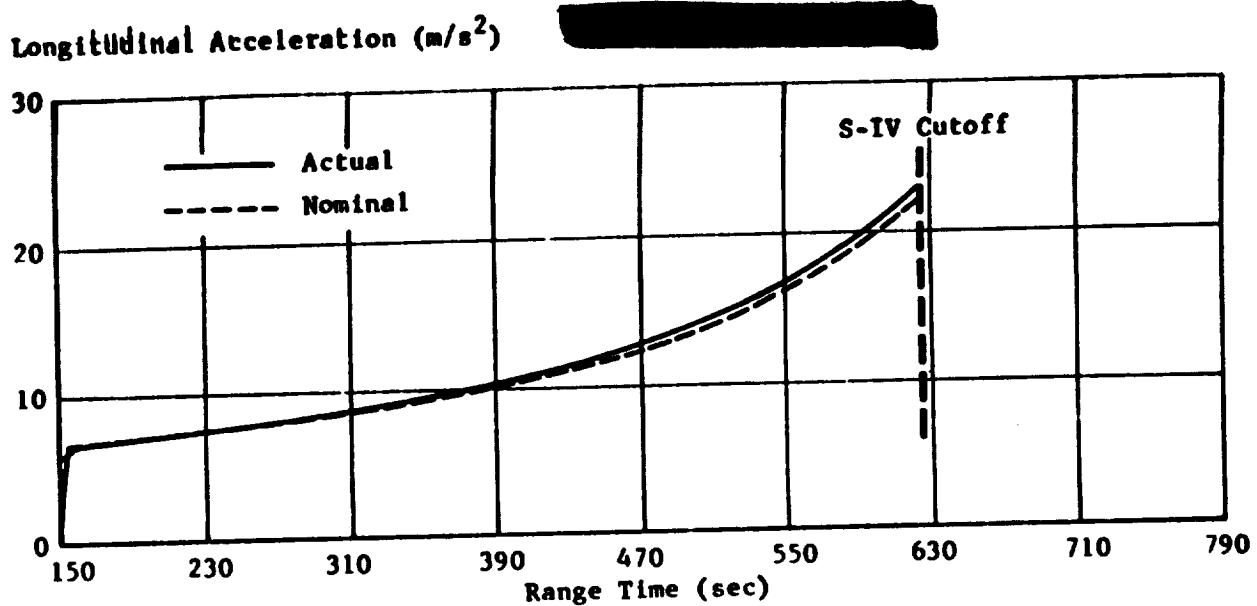
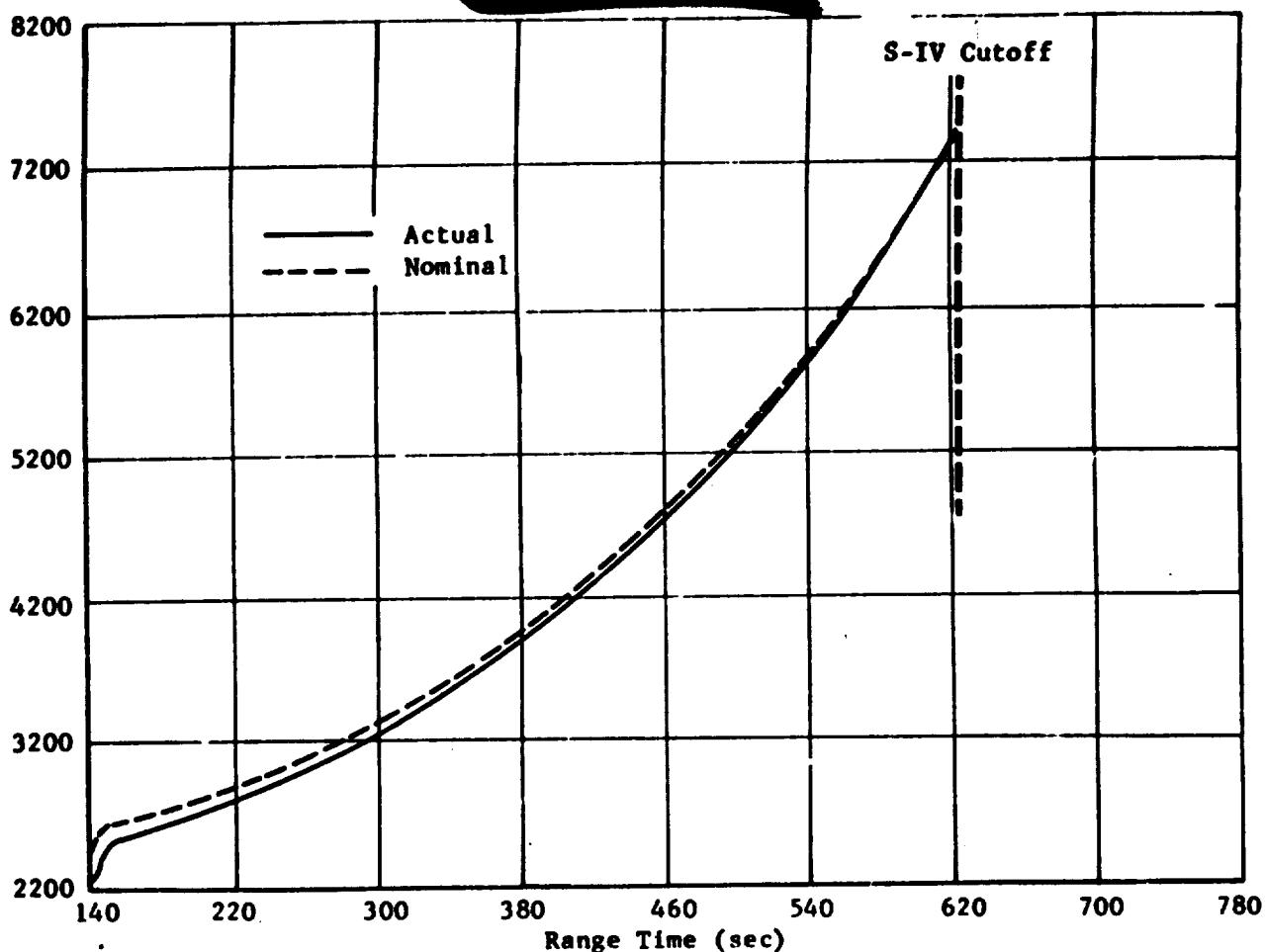


FIGURE 12 LONGITUDINAL ACCELERATION

Earth-Fixed Velocity (m/s)



Earth-Fixed Velocity (m/s)

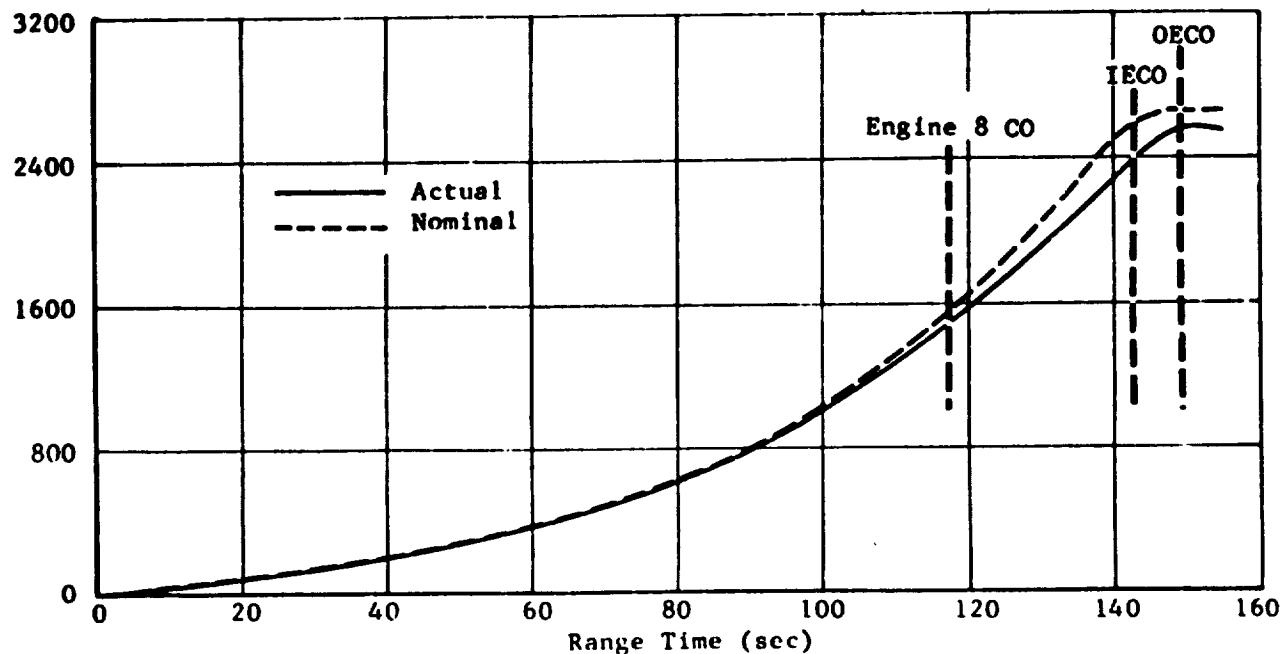


FIGURE 13 EARTH-FIXED VELOCITY

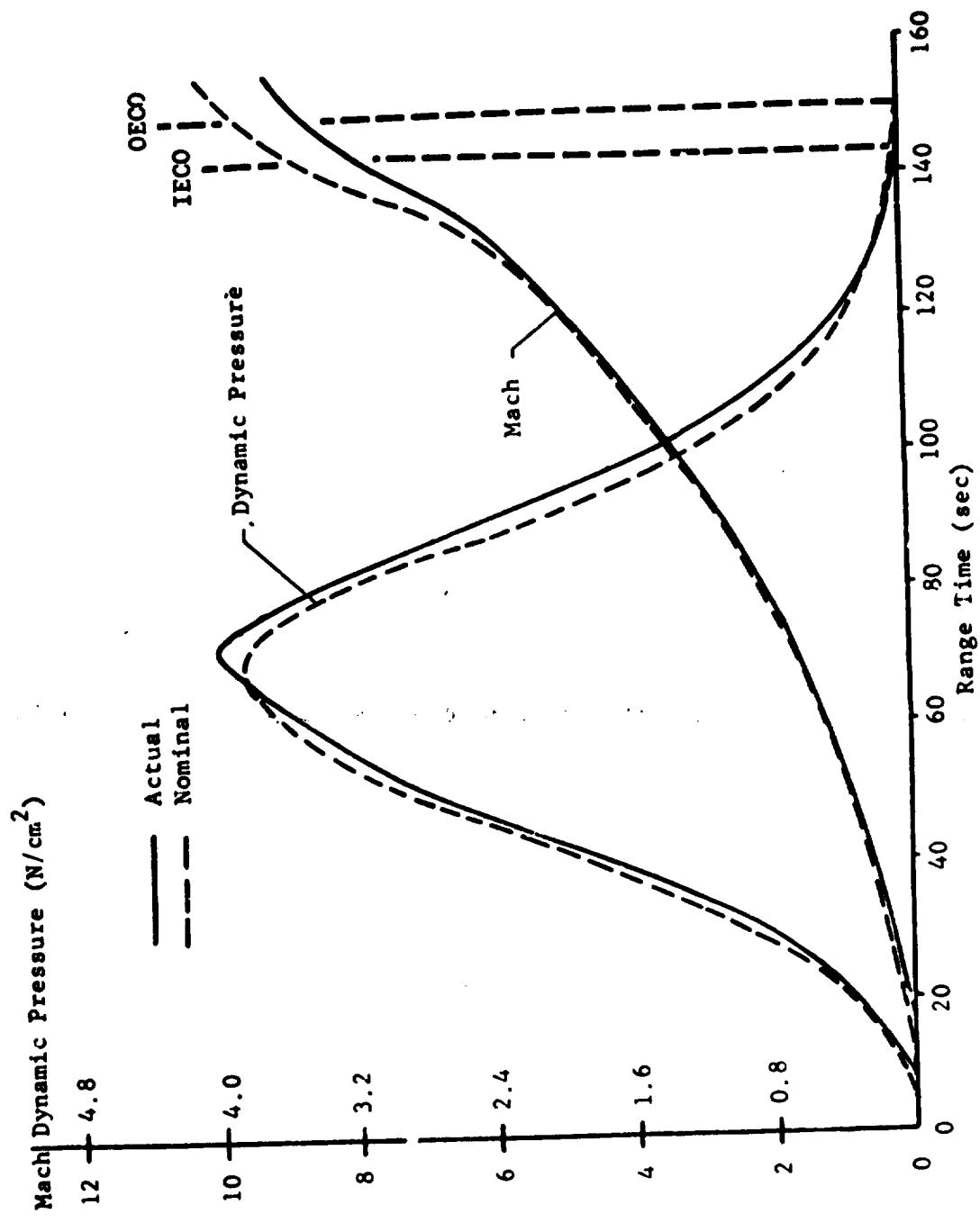


FIGURE 14 MACH NUMBER AND DYNAMIC PRESSURE

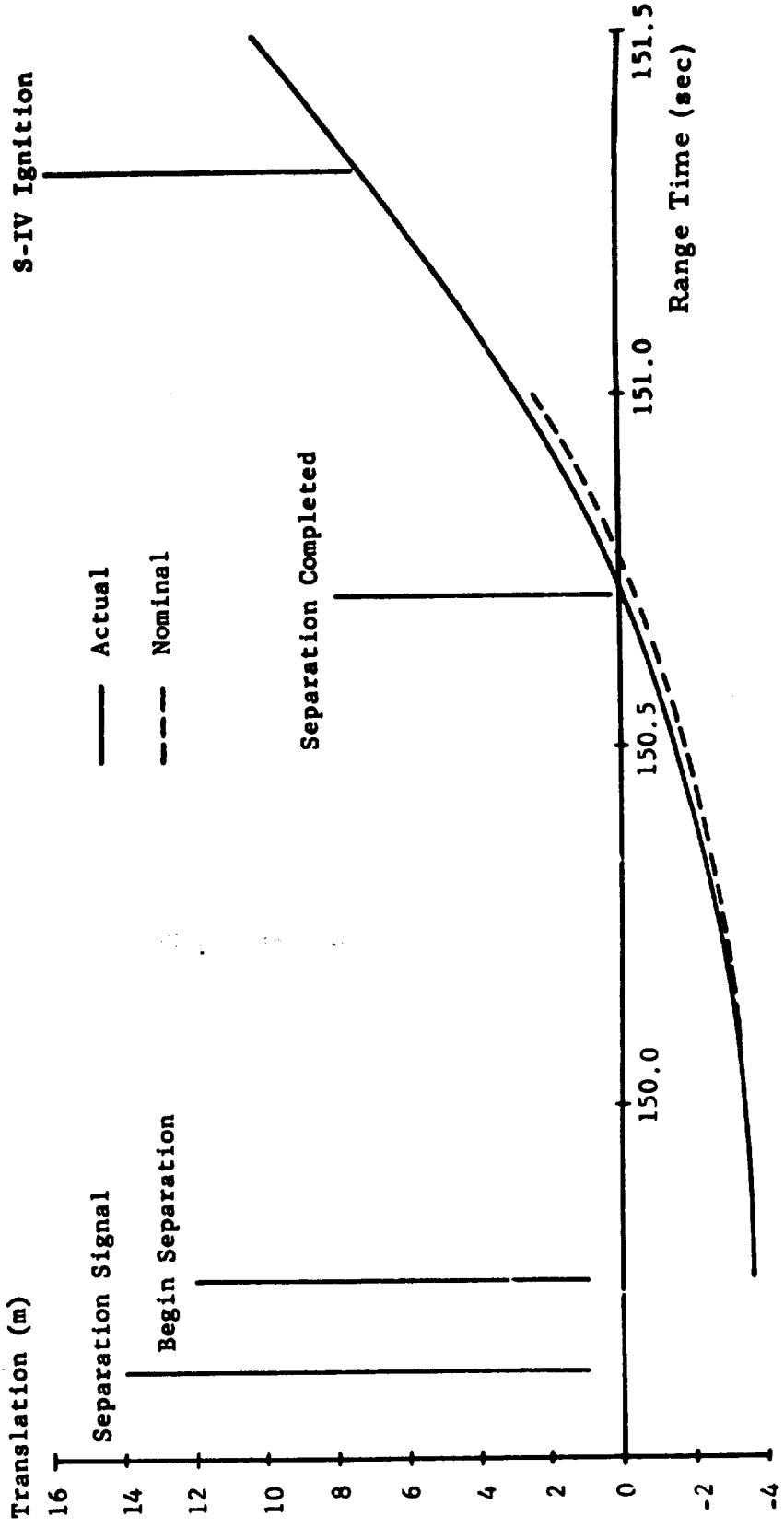


FIGURE 15 RELATIVE S-I/S-IV LONGITUDINAL TRANSLATION DISTANCE

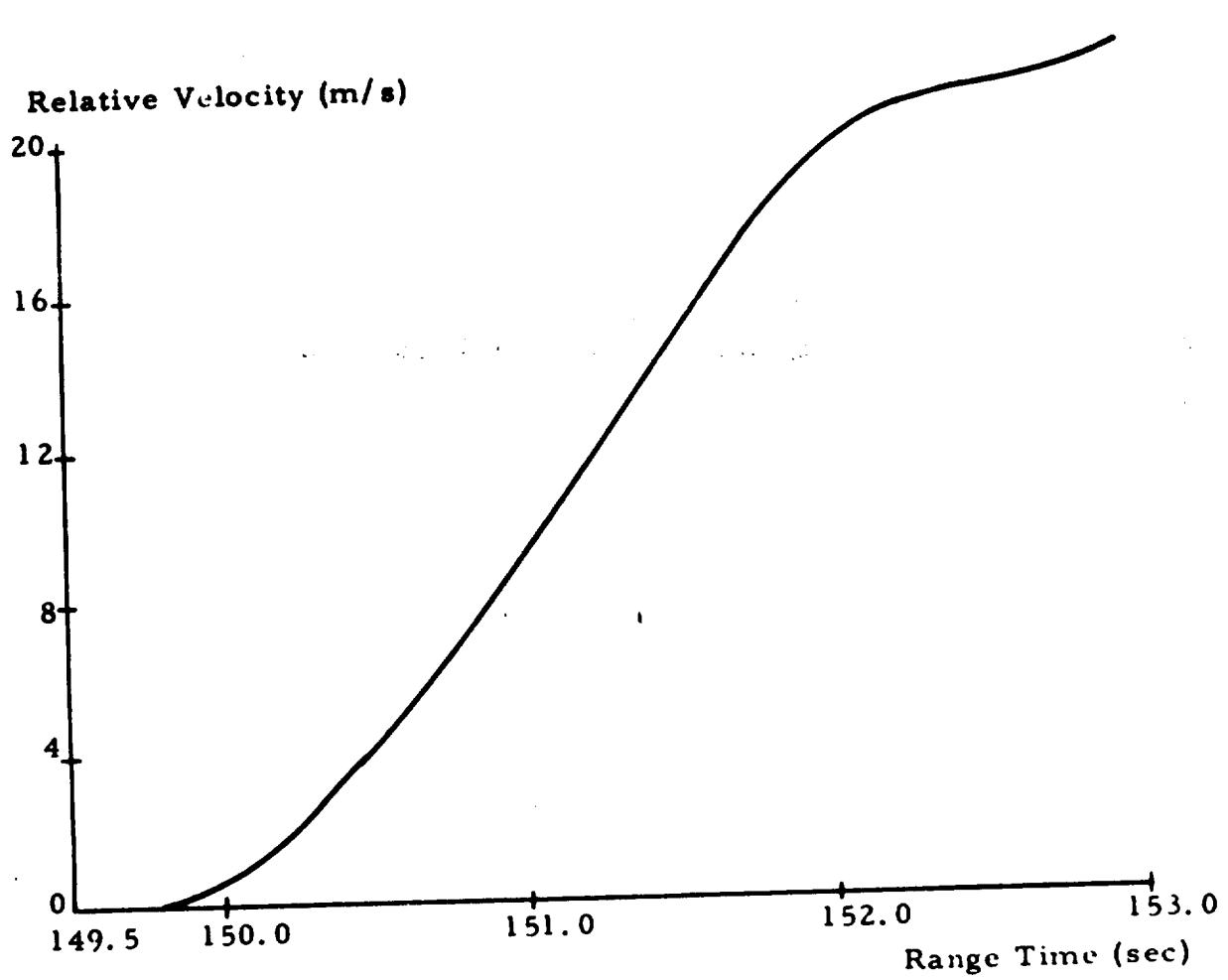
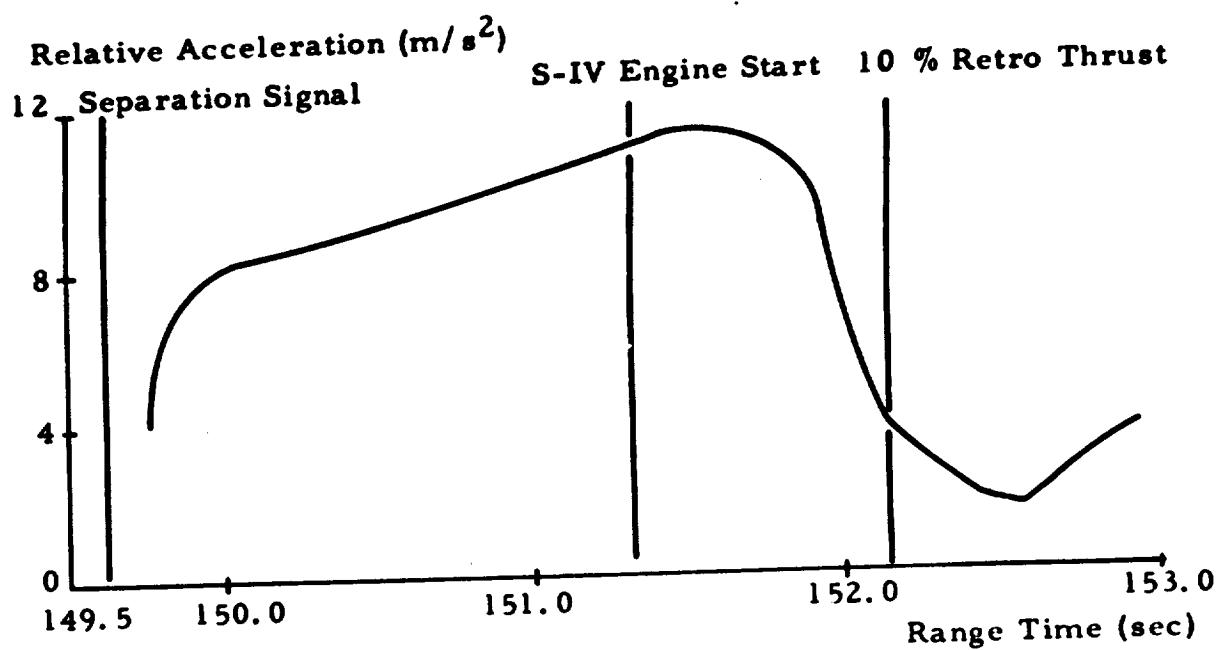


FIGURE 16 RELATIVE S-I/S-IV LONGITUDINAL ACCELERATION AND VELOCITY AFTER SEPARATION

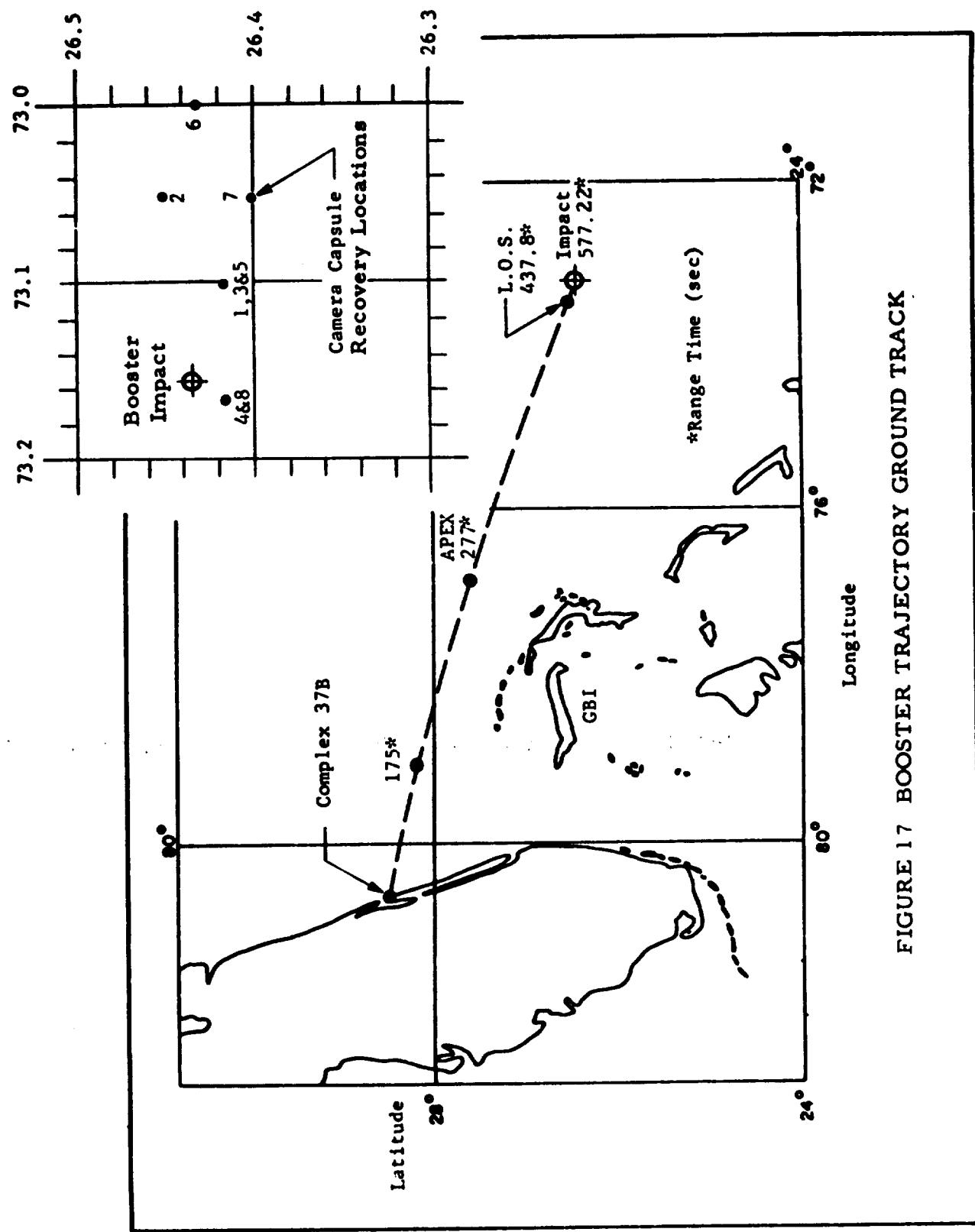


FIGURE 17 BOOSTER TRAJECTORY GROUND TRACK

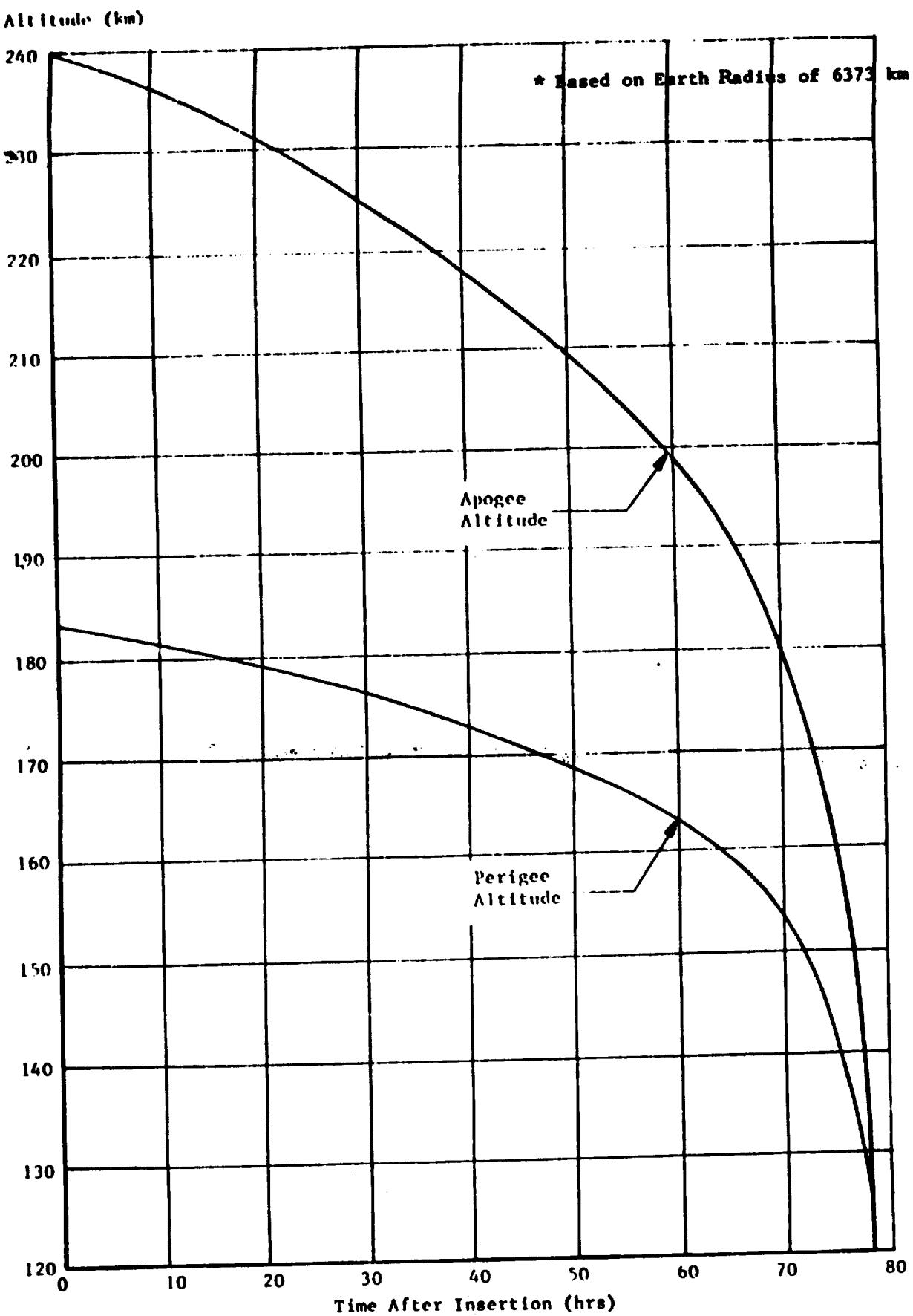


FIGURE 18 SA-6 APOGEE AND PERIGEE ALTITUDES

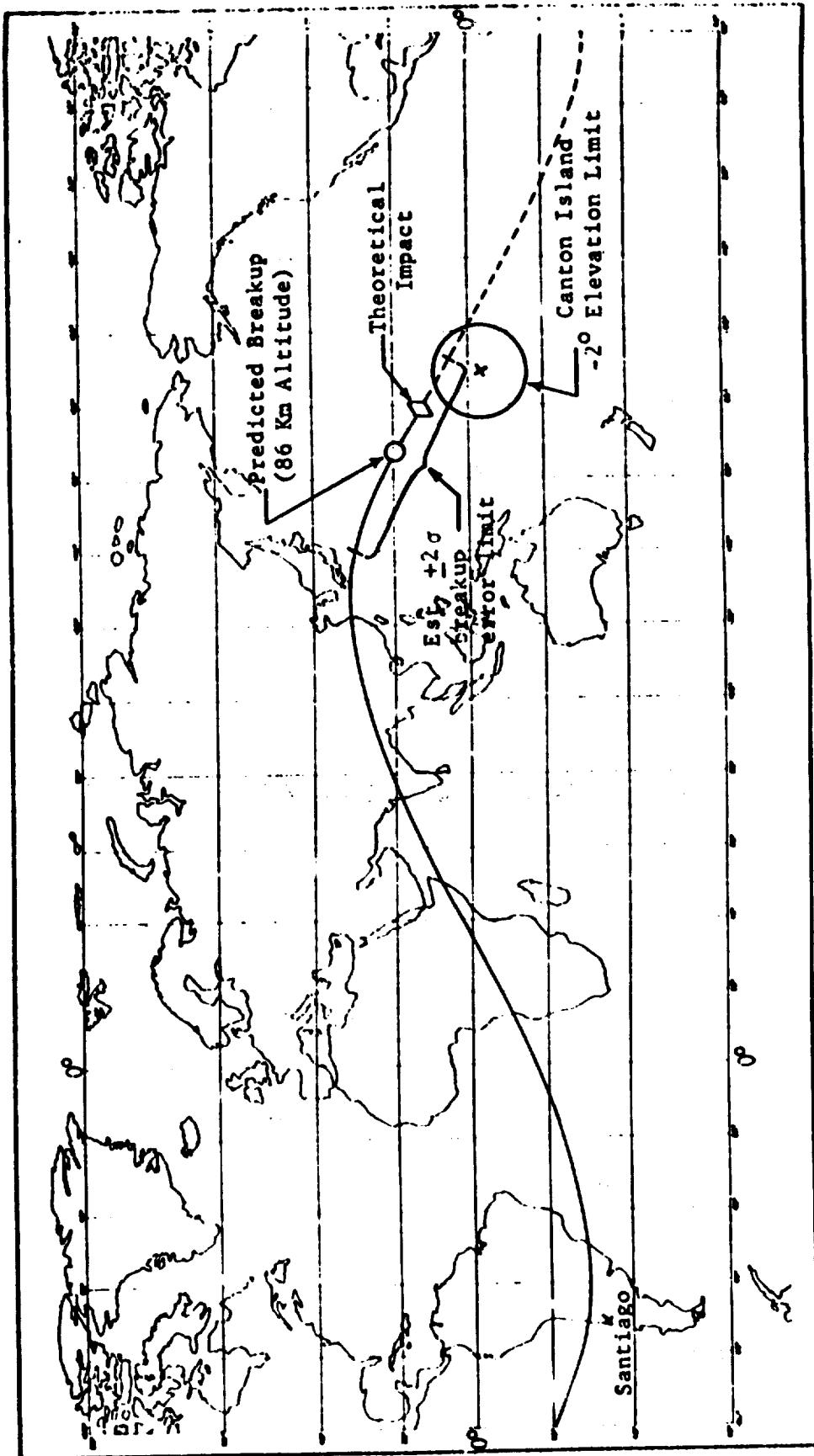


FIGURE 19 SA-6 FINAL ORBIT AND RE-ENTRY

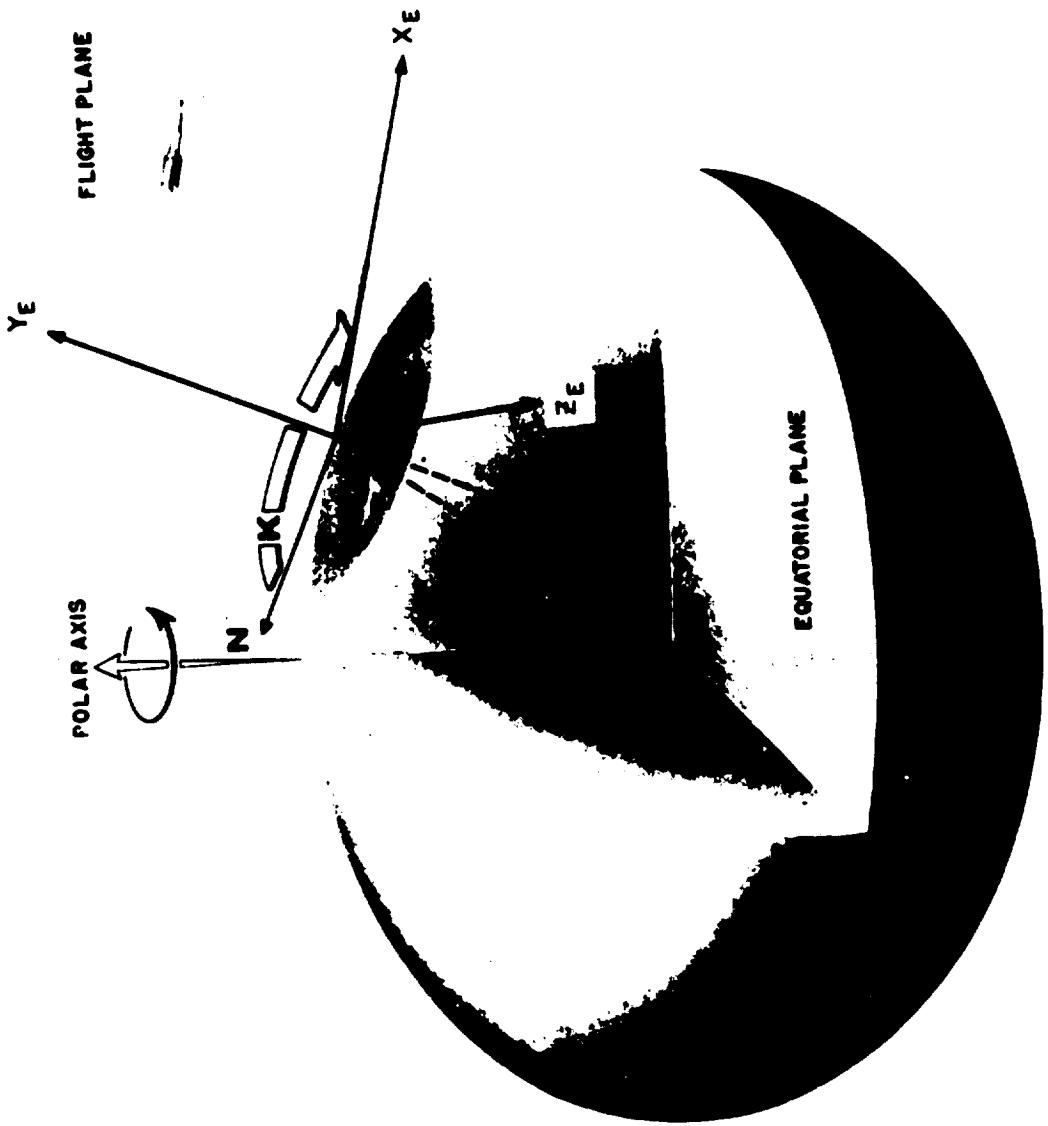


FIGURE 20. EARTH-CENTERED COORDINATE SYSTEM

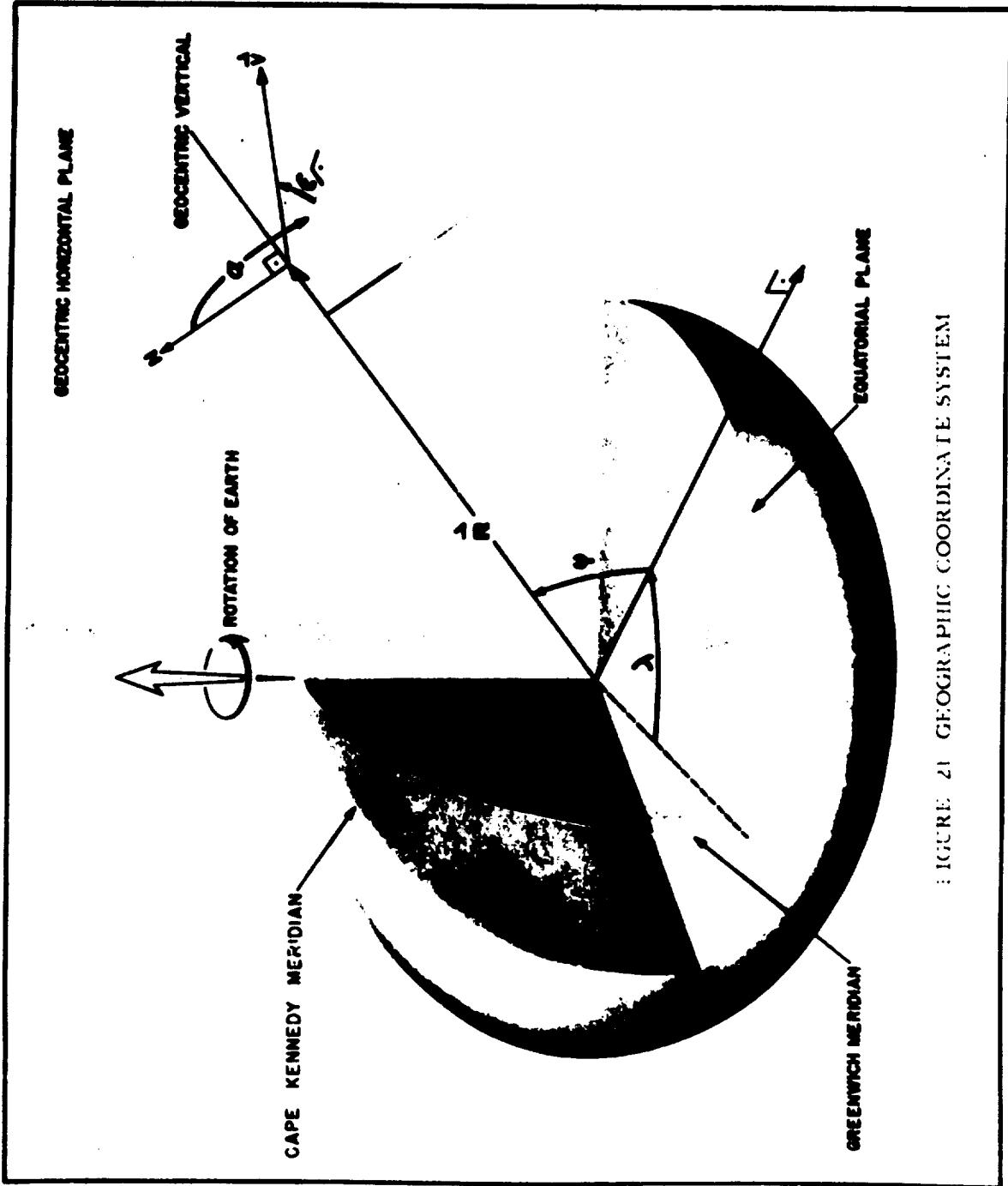


FIGURE 21 GEOGRAPHIC COORDINATE SYSTEM

**TABLE I (U) TRACKING DATA SOURCES**

<u>Data Source</u>	<u>Time Available (sec)</u>
Fixed Camera	0.00 - 18.766
Theodolite	3.80 - 22.60
	27.00 - 100.00
Azusa	13.00 - 149.15
	155.35 - 460.00
ODOP	0.00 - 142.50
	144.00 - 149.50
	166.00 - 400.00
Cape Kennedy (1.16) Radar (FPS-16)	0.00 - 67.00
	82.50 - 446.00
G. B. I. (3.16) Radar (FPS-16)	78.00 - 482.00
San Salvador (5.16) Radar(FPS-16)	175.00 - 590.00
Grand Turk (7.18) Radar (TPQ-18)	276.00 - 581.00
Antigua (91.18) Radar(FPC-6)	571.00 - 815.00
Patrick AFB (0.18) Radar (FPQ-6) (tracked S-I booster after separation.)	12.00 - 149.60 149.70 - 405.00

**TABLE II (U) TIMES OF EVENTS**

Event	Range Time (sec)		
	Actual	Pred.	Act-Pred
Ignition Command	-2.95	-3.02	0.07
Commit	0.04	-	-
First Motion (Stub Fin Meas)	0.17	-	-
Liftoff Signal (IU Umb Disconnect)	0.40	-	-
Guidance Computer Release	0.43	-	-
Begin Roll Maneuver (ST-90S)	8.40	8.40	0
End Roll Maneuver (ST-90S)	12.70	13.40	-0.70
Begin Tilt (cam)	15.55	15.40	0.15
LH <sub>2</sub> Prestart and 5 Movie Cameras on (Signal)	107.01	107.00	0.01
Inboard Engine 8 cutoff	117.28	-	-
Freeze Tilt (cam)	134.55	134.40	0.15
S-IV LOX Prestart Signal (Ports Blown Open)	141.21	138.47	2.74
IECO	143.23	140.24	2.99
OECO	149.23	146.24	2.99
Ullage Rocket Ignition (Signal)	149.50	146.56	2.94
S-I/S-IV Separation (Signal)	149.62	146.64	2.98
Retro Rocket Ignition (Signal)	149.68	146.71	2.97
S-IV Ignition (Signal)	151.31	148.34	2.97
Jettison Ullage/LES (Signal)	161.62	158.64	2.98
Switch Platforms (ST-90S to ST-124)	163.62	160.64	2.98
Start Active ST-124 Guidance Commands (Resume Tilt)	168.23	164.24	3.99
End ST-124 Guid. Corrections (Stop Tilt)	622.13	623.93	-1.80
Guidance Velocity Cutoff Signal	624.86	625.93	-1.07
Insertion	634.86	635.93	-1.07

Note: All predicted times including and following IECO are based on a first motion time of 0.17 seconds.

TABLE III (C) SIGNIFICANT TRAJECTORY PARAMETERS

<u>Event</u>	<u>Parameter</u>	<u>Actual</u>	<u>Nominal</u>	<u>Act-Nom</u>
<b>First Motion</b>	Range Time (sec)	0.17	0.17	---
	Longitudinal Acceleration (m/s <sup>2</sup> )	13.00	13.03	-0.03
<b>Mach One</b>	Range Time (sec)	54.7	53.3	1.4
	Altitude (km)	6.76	6.76	0.00
	Range Time (sec)	72.5	70.0	2.5
<b>Maximum Dynamic Pressure</b>	Dynamic Pressure (N/cm <sup>2</sup> )	4.003	3.847	0.156
	Altitude (km)	12.70	12.32	0.38
	Range Time (sec)	149.33	146.24	3.09
<b>Maximum Longitudinal Acceleration (S-I stage)</b>	Acceleration (m/s <sup>2</sup> )	28.39	30.13	-1.74
	Range Time (sec)	149.46	146.24	3.22
	Velocity (km)	2558.85	2653.03	-94.18
<b>Maximum Earth-Fixed Velocity (S-I stage)</b>	Range Time (sec)	277.0	284.8	-7.8
	Velocity (m/s)	138.92	149.57	-10.65
	Altitude (km)	380.11	410.24	-30.13
<b>Apex (S-I Stage)</b>	Range Time (sec)	2274.0	2338.7	-64.7
	Altitude (km)			
	Range (km)			
<b>Apex (S-IV Stage)</b>	Earth-Fixed Velocity (m/s)			
	Range Time (sec)	430.80	417.17	13.63
	Altitude (km)	196.51	206.96	-8.45
<b>Loss of Telemetry (S-I Stage)</b>	Range (km)	978.98	947.22	31.76
	Earth-Fixed Velocity (m/s)	4391.331	4333.212	58.119
	Range Time (sec)	437.8	437.8*	----
<b>Impact (S-I Stage)</b>	Altitude (km)	32.97	52.45	-19.48
	Range (km)	739.57	763.37	-23.80
	Total Acceleration (m/s <sup>2</sup> )	-69.47	-16.10	-53.37
	Elevation Angle From Pad (deg)	-0.78	0.48	-1.26
	Range Time (sec)	577.2	595.6	-18.4
<b>Maximum Longitudinal Acceleration (S-IV Stage)</b>	Range (km)	767.93	826.41	-58.48
	Cross Range (km)	11.60	13.30	-1.70
	Geodetic Latitude (deg)	26.4935	26.2593	0.1929
	Longitude (deg)	73.1947	72.6004	0.5499
<b>Maximum Earth-Fixed Velocity (S-IV Stage)</b>	Range Time (sec)	624.91	625.93	-1.02
	Acceleration (m/s <sup>2</sup> )	23.29	22.36	0.93
	Range Time (sec)	625.00	625.93	-0.94
	Velocity (m/s)	7407.60	7401.38	6.28

NOTE: \* For comparison purposes only.

TABLE IV (C) CUTOFF CONDITIONS

PARAMETER	Engine 6 CO			TECO			OEKO			S-IV CO (Guidance Signal)		
	Actual	Nominal	Act-Nom	Actual	Nominal	Act-Nom	Actual	Nominal	Act-Nom	Actual	Nominal	Act-Nom
RANGE TIME (sec)	117.28	117.28*	---	143.23	140.24*	2.99	149.23	146.24*	2.99	624.86	625.93*	-1.07
Altitude (km)	39.97	41.31	-1.34	64.30	63.96	0.34	70.70	70.79	-0.09	182.77	185.15	-2.38
Range (km)	37.06	38.05	-0.99	80.04	76.98	3.06	93.34	90.69	2.65	2034.17	2035.83	-41.66
Cross Range, Z <sub>e</sub> (km)	-0.113	0.167	-0.260	0.086	0.358	-0.272	0.168	0.439	-0.271	50.04	50.01	0.03
Cross Range Velocity, z <sub>t</sub> (r/s)	2.774	6.371	-3.597	12.33	12.63	-0.30	14.20	14.48	-0.28	227.07	223.61	3.46
Earth-Fixed Velocity (m/s)	1496.50	1529.72	-33.22	2464.93	2492.89	-87.96	2553.81	2653.03	-99.22	7404.57	7401.38	3.19
Earth-Fixed Velocity Vector Elevation (deg)	33.87	36.19	-0.32	26.04	26.86	-0.82	24.94	25.73	-0.79	0.084	0.137	-0.053
Earth-Fixed Velocity Vector Azimut. (deg)	105.20	105.36	-0.16	105.63	105.61	0.02	105.72	105.70	0.02	115.06	115.17	-0.11
Space-Fixed Velocity (m/s)	1843.03	1874.86	-31.81	2770.75	2856.23	-85.48	2922.45	3019.39	-96.94	7808.92	7805.95	2.97
Longitudinal Acceleration (m/s <sup>2</sup> )	38.10	39.07	-0.97	47.74	56.75	-9.01	28.37	30.13	-1.76	23.20	22.36	0.94

\*Based on First Motion Time of 0.17 sec.

## Earth-Fixed Velocity Accuracy

Eng 6 CO  $\pm$  0.4 m/s  
OEKO  $\pm$  0.5 m/s  
S-IV CO  $\pm$  1.0 m/s

## Altitude Accuracy

Eng 6 CO  $\pm$  15 m  
OEKO  $\pm$  20 m  
S-IV CO  $\pm$  100 m

TABLE V (U) BOOSTER FREE FLIGHT TRAJECTORY

Time (sec)	Earth-Fixed Position			Earth-Fixed Velocity			Altitude (m)	Range (m)
	XE (m)	YE (m)	ZE (m)	DXE (m/s)	DYE (m/s)	DZE (m/s)		
160	119550	80687	317	2318	934	17	81793	102413
180	165851	97491	683	2313	751	20	99614	162976
200	212030	110678	1129	2305	568	24	114141	207424
220	258058	120201	1646	2297	385	28	125322	251872
240	303916	126074	2231	2288	203	31	133170	298172
260	349588	128307	2882	2279	21	34	137690	342620
280	395057	126905	3595	2268	-161	37	138888	387068
300	440306	121871	4367	2257	-343	40	136764	431516
320	485317	113204	5195	2244	-524	43	131317	475964
340	530073	100898	5076	2231	-706	45	122542	520412
360	574556	84944	7006	2217	-889	48	110429	564860
380	618745	65331	7982	2202	-1072	50	94968	611160
400	662615	42046	8999	2184	-1256	52	76146	655608
420	705929	15203	10050	2134	-1420	53	54055	701908
440	745358	-12873	11046	1600	-1229	41	30616	742652
460	763035	-27749	11508	337	-358	9	17926	763024
480	766163	-32489	11594	66	-196	2	13594	766728
500	766796	-36191	11614	7	-172	0	9995	767469
520	766722	-39347	11614	-10	-145	0	6852	767820
540	766472	-42025	11609	-13	-124	0	4164	767839
560	766207	-44358	11604	-13	-110	0	1816	767932
577.2	765993	-46162	11599	-12	-100	0	0	767934

**TABLE VI A (U)**  
**ORBITAL ELEMENTS AT INSERTION**

<b>Time</b>	17:17:34.86 U.T.
<b>Semi-Major Axis (km)</b>	<b>6584.50</b>
<b>Eccentricity</b>	<b>0.00428311</b>
<b>Inclination (deg)</b>	<b>31.7837</b>
<b>Right Ascension of Ascending Node (deg)</b>	<b>304.4813</b>
<b>Argument of Perigee (deg)</b>	<b>115.4931</b>
<b>True Anomaly (deg)</b>	<b>20.2477</b>
<b>Apparent Sidereal Time, 0 hr U.T. May 28, 1964 (deg)</b>	<b>245.56623</b>
<b>Space-Fixed Velocity (m/s)</b>	<b>7811.874</b>
<b>Azimuth of Space-Fixed Velocity (deg CW from North)</b>	<b>113.9305</b>
<b>Elevation of Space-Fixed Velocity (deg from local horizontal)</b>	<b>0.0846</b>
<b>Altitude from Earth Center (km)</b>	<b>6558.02</b>
<b>Geocentric Latitude (deg. North)</b>	<b>21.5675</b>
<b>Longitude (deg East)</b>	<b>-60.826</b>

TABLE VI B (U)

SA-6 ORBITAL TRACKING SUMMARY

Station	Number of Valid Tracking Passes			
	5/28	5/29	5/30	5/31
Antigua	①	1	1	1
Ascension	①	-	-	1
Grand Turk Island	①	1	3	2
Pretoria, South Africa	②	-	-	2
Carnarvon, Australia	①	5	6	6
White Sands, N. M.	②	2	3	3
Eglin, AFB, Fla.	①	2	4	2
Wallops Island	-	2	2	2
Pt. Arguello, Calif.	①	1	-	-
Patrick AFB, Fla.	①	2	5	4
Cape Kennedy, Fla	①	1	-	-
Trinidad	①	-	-	-
Johannesburg, South Africa (M)	2	2	2	2
Lima, Peru (M)	1	2	2	1
Santiago, Chile (M)	-	2	2	2
Woomera, Australia (M)	-	1	2	2
Fort Myers, Fla. (M)	-	1	2	3
Quito, Ecuador (M)	-	1	-	1
Arequipa, Peru (BN)	-	1	-	-
Olifanstein, South Africa (BN)	-	-	1	-
Woomera, Australia (BN)	-	-	-	1

**NOTE:**

Last beacon track of target at 20:15:36 U.T. (Ground Elapsed Time  
 $3^h\ 8^m\ 36^s$ ), at White Sands, N. M.

Last skin track of target at 20:47:50 U.T., at Pretoria, South Africa.

○ denotes beacon track pass.

(M) denotes minitrack station

(BN) denotes Baker Nunn station.

TABLE VII (U)

TIME SEC	EARTH-FIXED-POSITION			EARTH-FIXED-VELOCITY		
	X <sub>E</sub> M	Y <sub>E</sub> M	Z <sub>E</sub> M	D <sub>X</sub> <sub>E</sub> M/SEC	D <sub>Y</sub> <sub>E</sub> M/SEC	D <sub>Z</sub> <sub>E</sub> M/SEC
FIRST MOTION						
0.170	0	32	0	-0.	0.	0.
LIFTOFF SIGNAL						
0.400	0	32	0	-0.0	0.7	0.0
1.0	0	33	0	-0.0	2.6	0.0
2.0	0	37	0	-0.1	5.8	0.0
3.0	0	45	0	-0.1	9.0	-0.0
4.0	0	55	0	-0.1	12.3	-0.1
5.0	0	69	0	-0.1	15.7	-0.1
6.0	-0	87	0	-0.2	19.3	-0.2
7.0	-0	108	0	-0.2	23.0	-0.2
8.0	-0	133	-0	-0.2	26.8	-0.2
9.0	-0	161	-0	-0.3	30.6	-0.3
10.0	-0	194	-0	-0.3	34.6	-0.3
11.0	-1	231	-1	-0.3	38.6	-0.3
12.0	-1	271	-1	-0.4	42.7	-0.4
13.0	-1	316	-2	-0.4	46.9	-0.4
14.0	-2	365	-2	-0.4	51.2	-0.5
15.0	-2	418	-3	-0.4	55.6	-0.6
16.0	-2	476	-3	-0.3	60.1	-0.6
17.0	-3	539	-4	-0.1	64.8	-0.7
18.0	-3	606	-5	0.2	69.5	-0.8
19.0	-3	678	-5	0.6	74.3	-0.8
20.0	-2	754	-6	1.2	79.2	-0.9
21.0	-1	836	-7	2.1	84.1	-0.9
22.0	0	923	-8	3.2	88.9	-1.0
23.0	4	1014	-9	4.6	93.8	-1.1
24.0	9	1111	-10	6.1	98.8	-1.1
25.0	16	1212	-11	8.0	104.0	-1.1
26.0	25	1319	-12	10.0	109.2	-1.1
27.0	36	1430	-13	12.2	114.4	-1.0
28.0	50	1548	-14	14.7	119.7	-1.0
29.0	66	1670	-15	17.4	125.0	-1.0
30.0	85	1798	-16	20.4	130.4	-0.9

TABLE VII (U)

TIME SEC	EARTH-FIXED-POSITION			EARTH-FIXED-VELOCITY		
	XE M	YE M	ZE M	DXE M/SEC	DYE M/SEC	DZE M/SEC
31.0	107	1931	-17	23.6	135.8	-0.8
32.0	132	2069	-18	27.0	141.3	-0.7
33.0	161	2213	-19	30.8	146.9	-0.6
34.0	194	2363	-19	35.0	152.4	-0.5
35.0	231	2519	-20	39.5	158.0	-0.5
36.0	273	2679	-20	44.5	163.6	-0.5
37.0	320	2845	-20	49.9	169.1	-0.5
38.0	373	3017	-21	55.5	174.6	-0.5
39.0	431	3195	-21	61.4	180.2	-0.5
40.0	495	3378	-22	67.3	185.8	-0.5
41.0	566	3566	-22	73.4	191.5	-0.5
42.0	642	3761	-23	79.5	197.3	-0.4
43.0	725	3961	-23	85.7	203.2	-0.3
44.0	814	4167	-24	91.9	209.1	-0.3
45.0	909	4379	-24	98.2	215.2	-0.3
46.0	1010	4597	-24	104.6	221.3	-0.3
47.0	1119	4822	-24	111.0	227.6	-0.3
48.0	1232	5053	-25	117.4	233.9	-0.3
49.0	1353	5290	-25	124.0	240.2	-0.2
50.0	1480	5533	-25	130.7	246.6	-0.2
51.0	1614	5783	-25	137.6	253.1	-0.3
52.0	1755	6039	-25	144.6	259.6	-0.3
53.0	1903	6302	-26	151.7	266.0	-0.3
54.0	2059	6571	-26	159.9	272.3	-0.4
MACH ONE						
54.705	2172	6765	-27	163.9	276.7	-0.4
55.0	2221	6947	-27	166.1	278.5	-0.5
56.0	2391	7128	-27	173.4	284.4	-0.7
57.0	2568	7416	-28	180.8	290.3	-1.0
58.0	2753	7707	-29	188.3	296.1	-1.3
59.0	2945	8008	-31	195.8	302.0	-1.7
60.0	3144	8313	-33	203.3	309.0	-2.0
61.0	3351	8624	-35	210.9	314.1	-2.4
62.0	3566	8941	-37	218.7	320.4	-2.8
63.0	3787	9265	-40	226.7	326.9	-3.2
64.0	4019	9595	-44	234.9	333.5	-3.4
65.0	4259	9922	-47	243.1	340.4	-3.6

TABLE VII (U)

TIME SEC	EARTH-FIXED-POSITION			EARTH-FIXED-VELOCITY		
	XE M	YE M	ZE M	DXE M/SEC	DYE M/SEC	DZE M/SEC
66.0	4506	10275	-51	251.1	347.6	-3.8
67.0	4761	10626	-55	259.2	355.1	-3.9
68.0	5024	10984	-58	267.4	362.8	-4.0
69.0	5296	11350	-62	275.8	370.6	-4.1
70.0	5576	11724	-66	284.4	378.6	-4.1
71.0	5864	12106	-70	293.4	386.8	-4.1
72.0	6162	12497	-74	302.7	395.0	-4.0
MAXIMUM DYNAMIC PRESSURE						
72.500	6314	12695	-76	307.5	399.2	-4.0
73.0	6469	12896	-78	312.4	403.4	-3.9
74.0	6786	13303	-82	322.5	411.8	-3.8
75.0	7113	13719	-86	333.2	420.3	-3.7
76.0	7451	14144	-89	344.7	428.7	-3.6
77.0	7802	14577	-93	356.9	437.1	-3.5
78.0	8165	15019	-96	369.4	445.7	-3.2
79.0	8541	15469	-99	382.3	454.4	-2.9
80.0	8929	15928	-102	395.6	463.2	-2.5
81.0	9332	16396	-104	409.3	472.2	-2.2
82.0	9748	16873	-105	423.4	481.2	-2.0
83.0	10178	17359	-108	437.9	490.4	-1.9
84.0	10523	17854	-110	452.9	499.6	-1.8
85.0	11084	18358	-112	468.4	509.0	-1.7
86.0	11560	18872	-113	484.3	518.5	-1.6
87.0	12052	19396	-115	500.7	528.1	-1.6
88.0	12561	19929	-116	517.6	537.8	-1.5
89.0	13087	20472	-118	535.0	547.5	-1.6
90.0	13631	21024	-119	552.9	557.2	-1.6
91.0	14193	21587	-121	571.5	566.9	-1.6
92.0	14774	22158	-123	590.8	576.5	-1.5
93.0	15375	22740	-124	610.6	586.2	-1.4
94.0	15995	23331	-125	630.9	595.8	-1.2
95.0	16636	23932	-126	651.5	605.4	-1.0
96.0	17298	24542	-127	672.8	615.1	-0.9
97.0	17982	25153	-128	694.5	624.8	-0.8
98.0	18688	25792	-129	716.8	634.5	-0.7
99.0	19416	26432	-130	739.7	644.2	-0.6
100.0	20167	27081	-130	763.1	653.8	-0.4

TABLE VII (U)

TIME SEC	EARTH-FIXED-POSITION			EARTH-FIXED-VELOCITY		
	X <sub>E</sub> M	Y <sub>E</sub> "	Z <sub>E</sub> "	D <sub>X</sub> <sub>E</sub> M/SEC	D <sub>Y</sub> <sub>E</sub> M/SEC	D <sub>Z</sub> <sub>E</sub> M/SEC
101.0	20942	27740	-130	787.0	663.5	-0.3
102.0	21741	28408	-131	811.5	673.2	-0.1
103.0	22565	29087	-131	836.4	683.0	0.1
104.0	23414	29775	-130	861.7	692.8	0.3
105.0	24288	30473	-130	887.5	702.6	0.4
106.0	25189	31190	-130	913.8	712.5	0.6
107.0	26116	31898	-129	940.7	722.5	0.7
108.0	27070	32626	-129	968.0	732.5	0.9
109.0	28052	33363	-127	995.9	742.4	1.1
110.0	29062	34111	-125	1024.4	752.5	1.3
111.0	30101	34869	-124	1053.3	762.6	1.5
112.0	31169	35636	-123	1082.8	772.7	1.7
113.0	32257	36414	-121	1112.8	782.7	2.0
114.0	33395	37202	-119	1143.5	792.8	2.1
115.0	34555	38000	-117	1174.8	802.9	2.2
116.0	35746	38809	-115	1206.5	813.1	2.4
117.0	36968	39626	-113	1238.9	823.1	2.7

## ENGINE EIGHT PREMATURE SHUTDOWN

117.280	37317	39857	-112	1248.0	825.9	2.8
118.0	38222	40453	-110	1268.8	831.5	3.0
119.0	39505	41299	-107	1298.1	839.2	3.5
120.0	40819	42132	-103	1327.7	846.8	3.8
121.0	42162	42982	-99	1357.8	854.3	4.2
122.0	43535	43840	-95	1388.4	861.8	4.6
123.0	44940	44706	-90	1419.5	869.3	5.0
124.0	45375	45577	-85	1451.1	876.8	5.3
125.0	47847	46459	-80	1483.4	884.1	5.8
126.0	49343	47347	-74	1516.1	891.5	6.1
127.0	50876	49241	-69	1549.4	898.8	6.5
128.0	52442	49144	-61	1583.4	906.0	6.8
129.0	54043	50053	-54	1617.9	913.2	7.3
130.0	55679	50969	-47	1653.1	920.2	7.6
131.0	57350	51873	-39	1688.8	927.3	8.0
132.0	59047	52823	-31	1725.2	934.4	8.4
133.0	60801	53761	-23	1762.2	941.5	8.8
134.0	62542	54705	-14	1799.8	948.6	9.2
135.0	64402	55657	-4	1838.0	955.9	9.6

TABLE VII (U)

TIME SEC	EARTH-FIXED-POSITION			EARTH-FIXED-VELOCITY		
	XE M	YE M	ZE M	DXE M/SEC	DYE M/SEC	DZE M/SEC
136.0	66259	56616	4	1876.8	964.4	10.0
137.0	68156	57583	14	1916.0	971.3	10.4
138.0	70092	58558	25	1956.0	979.4	10.8
139.0	72068	59540	36	1996.5	987.8	11.1
140.0	74086	60532	47	2037.6	996.6	11.5
141.0	76145	61532	59	2079.3	1005.6	11.8
142.0	78247	62542	71	2121.5	1015.0	11.8
143.0	80390	63561	83	2164.6	1024.6	12.2
<b>IEC0</b>						
143.230	80892	63797	86	2174.6	1026.9	12.3
144.0	82569	64586	96	2199.1	1030.7	12.5
145.0	84783	65618	109	2224.6	1032.7	12.8
146.0	87020	66650	122	2249.6	1034.6	13.1
147.0	89282	67685	136	2274.9	1036.6	13.5
148.0	91570	68721	150	2300.3	1038.6	13.9
149.0	93883	69752	163	2326.0	1040.6	14.1
<b>DEC0</b>						
149.230	94422	70004	168	2331.9	1041.2	14.2
150.0	96212	70805	186	2339.6	1036.6	14.9
151.0	98552	71837	201	2340.3	1027.6	15.0
<b>S-IV IGNITION</b>						
151.310	99278	72155	206	2340.5	1024.8	15.0
152.0	100893	72860	216	2340.8	1018.4	15.2
153.0	103234	73874	231	2342.6	1009.9	15.3
154.0	105579	74880	247	2346.9	1002.6	15.5
155.0	107928	75879	262	2352.6	995.9	15.5
156.0	110284	76872	278	2358.2	989.1	15.7
157.0	112645	77857	294	2363.7	982.4	15.9
158.0	115011	78837	309	2369.1	975.8	16.1
159.0	117383	79809	326	2374.6	969.2	16.3
160.0	119760	80775	342	2380.1	962.5	16.5

TABLE VII (U)

TIME SEC	EARTH-FIXED-POSITION			EARTH-FIXED-VELOCITY		
	XE M	YE M	ZE M	DXE M/SEC	DYE M/SEC	DZE M/SEC
161.0	122143	81734	359	2385.6	955.7	16.7
162.0	124532	82686	375	2391.2	949.1	16.9
163.0	126926	83632	392	2396.9	942.6	17.1
164.0	129325	84572	410	2402.7	936.1	17.3
165.0	131731	85505	427	2408.5	929.6	17.4
166.0	134143	86431	444	2414.3	923.1	17.6
167.0	136560	87351	462	2420.2	916.6	17.7
168.0	138983	88264	480	2426.0	910.1	17.9
169.0	141412	89171	498	2431.8	903.6	18.1
170.0	143846	90071	516	2437.6	897.3	18.3
171.0	146287	90965	535	2443.4	890.8	18.6
172.0	148733	91853	553	2449.1	884.4	19.0
173.0	151185	92734	573	2454.9	878.2	19.6
174.0	153643	93609	592	2460.5	872.1	20.3
175.0	156106	94478	613	2466.2	866.0	21.1
176.0	158575	95341	635	2471.9	859.9	22.0
177.0	161050	96198	657	2477.5	854.0	22.9
178.0	163530	97049	680	2483.1	848.0	23.8
179.0	166016	97894	705	2488.8	841.9	24.6
180.0	168508	98733	730	2494.5	835.8	25.4
181.0	171005	99566	755	2500.2	829.9	26.2
182.0	173508	100393	782	2505.9	823.9	27.0
183.0	176017	101214	810	2511.6	817.9	27.8
184.0	178531	102029	838	2517.4	811.8	28.5
185.0	181052	102837	866	2523.1	805.7	29.1
186.0	183578	103640	896	2528.8	799.6	29.8
187.0	186109	104437	926	2534.6	793.7	30.5
188.0	188647	105227	957	2540.5	787.6	31.2
189.0	191190	106012	988	2546.3	781.5	31.8
190.0	193740	106790	1021	2552.2	775.4	32.5
191.0	196295	107563	1053	2558.0	769.3	33.1
192.0	198856	108329	1087	2553.9	763.1	33.7
193.0	201422	109089	1121	2559.8	757.0	34.3
194.0	203995	109843	1155	2575.7	750.9	34.9
195.0	206574	110591	1191	2581.6	744.9	35.5
196.0	209158	111333	1226	2587.5	738.7	36.1
197.0	211749	112068	1263	2593.5	732.7	36.6
198.0	214345	112798	1300	2599.4	726.6	37.2
199.0	216948	113521	1337	2605.4	720.5	37.7
200.0	219556	114239	1375	2611.4	714.4	38.2

TABLE VII (U)

TIME SEC	EARTH-FIXED-POSITION			EARTH-FIXED-VELOCITY		
	XE M	YE "	ZE M	DXE M/SEC	DYE M/SEC	DZE M/SEC
201.0	222170	11950	1414	2617.3	708.4	38.7
202.0	224791	115656	1453	2623.3	702.4	39.2
203.0	227417	113355	1492	2629.2	696.3	39.7
204.0	230049	117044	1532	2635.2	690.3	40.2
205.0	232687	117736	1572	2641.2	684.2	40.7
206.0	235332	118417	1613	2647.2	678.2	41.1
207.0	237982	119092	1655	2653.3	672.1	41.5
208.0	240639	119761	1696	2659.3	666.1	42.0
209.0	243300	120424	1739	2665.3	660.1	42.4
210.0	245969	121091	1781	2671.4	654.2	42.8
211.0	248643	121733	1824	2677.4	648.2	43.2
212.0	251324	122378	1867	2683.5	642.3	43.6
213.0	254010	123017	1911	2689.6	636.3	44.0
214.0	256703	123650	1955	2695.6	630.3	44.3
215.0	259401	124279	2000	2701.7	624.3	44.7
216.0	262106	124839	2045	2707.9	618.3	45.1
217.0	264817	125514	2090	2714.0	612.3	45.5
218.0	267534	126124	2136	2720.2	606.4	45.8
219.0	270257	126727	2182	2726.3	600.4	46.1
220.0	272987	127324	2228	2732.5	594.4	46.5
221.0	275722	127916	2275	2738.7	588.4	46.8
222.0	278464	128501	2321	2745.0	582.4	47.1
223.0	281212	129091	2369	2751.2	576.4	47.4
224.0	283967	129654	2416	2757.4	570.4	47.7
225.0	286727	130221	2454	2763.6	564.4	48.0
226.0	289474	130783	2512	2769.9	558.5	48.3
227.0	292267	131338	2561	2776.2	552.5	48.6
228.0	295046	131898	2610	2782.5	546.5	48.9
229.0	297832	132431	2659	2788.8	540.4	49.2
230.0	300624	132969	2708	2795.1	534.4	49.5
231.0	303422	133500	2758	2801.5	528.4	49.8
232.0	306227	134026	2808	2807.8	522.3	50.0
233.0	309038	134545	2858	2814.2	516.4	50.3
234.0	311855	135058	2908	2820.6	510.4	50.6
235.0	314679	135566	2959	2827.0	504.4	50.8
236.0	317509	136067	3010	2833.3	498.4	51.1
237.0	320346	136563	3061	2839.7	492.5	51.4
238.0	323189	137052	3112	2846.1	486.5	51.6
239.0	326038	137535	3164	2852.6	480.5	51.9
240.0	328894	138013	3216	2859.0	474.5	52.1

TABLE VII (U)

TIME SEC	EARTH-FIXED-POSITION			EARTH-FIXED-VELOCITY			DZE M/SEC
	XE M	YE M	ZE M	DXE M/SEC	DYE M/SEC		
241.0	331756	138484	3268	2855.5	468.5		52.4
242.0	334625	138950	3321	2871.9	462.6		52.6
243.0	337500	139410	3374	2878.3	456.6		52.9
244.0	340381	139863	3427	2884.8	450.8		53.1
245.0	343269	140311	3480	2891.3	444.6		53.3
246.0	346164	140753	3533	2897.8	438.9		53.6
247.0	349065	141189	3587	2904.3	432.9		53.8
248.0	351973	141610	3641	2910.8	427.0		54.0
249.0	354887	142043	3695	2917.3	421.0		54.3
250.0	357807	142461	3749	2923.8	415.1		54.5
251.0	360734	142873	3804	2930.4	409.3		54.8
252.0	363668	143279	3859	2936.9	403.3		55.0
253.0	366608	143680	3914	2943.5	397.4		55.2
254.0	369555	144074	3969	2950.0	391.5		55.4
255.0	372508	144463	4025	2956.6	385.6		55.7
256.0	375468	144845	4081	2963.2	379.7		55.9
257.0	378434	145222	4137	2969.7	373.7		56.1
258.0	381407	145593	4193	2976.3	367.8		56.3
259.0	384387	145958	4249	2982.9	361.9		56.5
260.0	387373	146317	4306	2989.6	356.0		56.8
261.0	390366	146670	4363	2996.2	350.1		57.0
262.0	393365	147017	4420	3002.8	344.2		57.2
263.0	396372	147358	4477	3009.4	338.4		57.4
264.0	399384	147694	4535	3016.0	332.5		57.6
265.0	402404	148023	4593	3022.6	326.6		57.9
266.0	405430	148347	4651	3029.3	320.8		58.1
267.0	408462	148665	4709	3035.9	314.9		58.3
268.0	411502	148977	4767	3042.6	309.0		58.5
269.0	414547	149293	4826	3049.3	303.2		58.8
270.0	417600	149593	4885	3056.0	297.4		59.0
271.0	420659	149877	4944	3052.7	291.6		59.2
272.0	423728	150166	5003	3069.4	285.7		59.5
273.0	426708	150449	5063	3076.1	279.8		59.7
274.0	429878	150726	5123	3082.9	274.0		59.9
275.0	432964	150997	5183	3089.6	268.1		60.1
276.0	436057	151262	5243	3096.4	262.2		60.3
277.0	439157	151521	5303	3103.1	256.4		60.6
278.0	442263	151775	5364	3109.9	250.7		60.8
279.0	445377	152023	5425	3116.8	244.9		61.1
280.0	448497	152265	5486	3123.6	239.0		61.3

TABLE VII (U)

TIME SEC	EARTH-FIXED-POSITION			EARTH-FIXED-VELOCITY		
	XE M	YE M	ZE M	DXE M/SEC	DYE M/SEC	DZE M/SEC
281.0	451524	152501	5547	3130.4	233.2	61.5
282.0	454757	152731	5609	3137.2	227.3	61.8
283.0	457898	152955	5671	3144.0	221.5	62.0
284.0	461046	153174	5733	3150.8	215.7	62.2
285.0	464200	153387	5796	3157.7	210.0	62.5
286.0	467361	153594	5858	3164.5	204.2	62.7
287.0	470529	153795	5921	3171.3	198.4	63.0
288.0	473703	153991	5984	3178.2	192.6	63.2
289.0	476885	154180	6047	3185.1	186.8	63.4
290.0	480074	154364	6111	3191.9	181.1	63.7
291.0	483269	154542	6175	3198.8	175.3	63.9
292.0	486471	154715	6239	3205.7	169.5	64.2
293.0	489680	154881	6303	3212.6	163.8	64.5
294.0	492896	155042	6368	3219.6	158.0	64.7
295.0	496119	155197	6433	3226.5	152.2	64.9
296.0	499349	155347	6498	3233.4	146.4	65.2
297.0	502586	155490	6563	3240.3	140.7	65.5
298.0	505830	155628	6629	3247.3	134.9	65.7
299.0	509081	155760	6694	3254.2	129.2	66.0
300.0	512339	155886	6761	3261.2	123.4	66.2
301.0	515603	156007	6827	3268.2	117.6	66.5
302.0	518875	156122	6893	3275.2	111.8	66.7
303.0	522154	156231	6960	3282.3	106.1	67.0
304.0	525439	156334	7027	3289.3	100.3	67.3
305.0	528732	156431	7095	3296.4	94.5	67.5
306.0	532032	156523	7162	3303.5	88.7	67.8
307.0	535339	156609	7230	3310.6	82.9	68.0
308.0	538653	156689	7299	3317.7	77.1	68.3
309.0	541975	156763	7367	3324.9	71.4	68.6
310.0	545303	156831	7436	3332.1	65.6	68.9
311.0	548639	156894	7505	3339.3	59.8	69.1
312.0	551982	156951	7574	3346.5	53.9	69.4
313.0	555332	157002	7644	3353.7	48.1	69.7
314.0	558689	157047	7713	3360.9	42.3	70.0
315.0	562054	157086	7784	3368.2	36.4	70.3
316.0	565426	157120	7854	3375.5	30.6	70.6
317.0	568805	157148	7925	3382.7	24.8	70.8
318.0	572191	157169	7996	3390.0	18.9	71.1
319.0	575585	157185	8067	3397.4	13.1	71.4
320.0	578986	157196	8138	3404.7	7.3	71.7

TABLE VII (U)

TIME SEC	EARTH-FIXED-POSITION			EARTH-FIXED-VELOCITY		
	XE M	YE M	ZE M	DXE M/SEC	DYE M/SEC	DZE M/SEC
321.0	582394	157200	8210	3412.0	1.5	72.0
322.0	585810	157199	8282	3419.4	-4.4	72.3
323.0	589233	157191	9355	3426.8	-10.2	72.6
324.0	592663	157178	8428	3434.2	-16.0	72.9
325.0	596101	157159	8501	3441.6	-21.9	73.2
326.0	599547	157134	8574	3449.0	-27.8	73.5
327.0	602999	157104	8648	3456.5	-33.7	73.8
328.0	606459	157067	8722	3464.0	-39.4	74.1
329.0	609927	157025	8796	3471.4	-45.3	74.4
330.0	613402	156976	8870	3478.9	-51.3	74.7
331.0	616885	156922	8945	3486.4	-57.1	75.0
332.0	620375	156862	9020	3494.0	-62.9	75.3
333.0	623873	156796	9096	3501.6	-68.8	75.6
334.0	627378	156725	9172	3509.1	-74.8	75.9
335.0	630891	156647	9248	3516.7	-80.7	76.2
336.0	634412	156563	9324	3524.3	-86.6	76.5
337.0	637940	156474	9401	3531.9	-92.4	76.8
338.0	641475	156378	9478	3539.6	-98.3	77.2
339.0	645019	156277	9555	3547.3	-104.2	77.5
340.0	648570	156170	9633	3554.9	-110.2	77.8
341.0	652129	156057	9711	3562.6	-116.1	78.1
342.0	655695	155938	9789	3570.3	-122.0	78.4
343.0	659269	155813	9868	3578.1	-127.9	78.8
344.0	662851	155682	9947	3585.9	-133.8	79.1
345.0	666441	155545	10026	3593.6	-139.8	79.4
346.0	670039	155402	10105	3601.4	-145.7	79.7
347.0	673644	155254	10185	3609.2	-151.6	80.1
348.0	677257	155099	10266	3617.0	-157.6	80.4
349.0	680878	154939	10346	3624.9	-163.5	80.8
350.0	684507	154772	10427	3632.7	-169.3	81.1
351.0	688143	154600	10508	3640.6	-175.3	81.4
352.0	691788	154422	10590	3648.5	-181.2	81.8
353.0	695440	154237	10672	3656.4	-187.2	82.1
354.0	699101	154047	10754	3664.4	-193.2	82.4
355.0	702769	153851	10837	3672.3	-199.2	82.8
356.0	706445	153649	10920	3680.3	-205.1	83.2
357.0	710130	153441	11003	3688.3	-211.1	83.5
358.0	713822	153227	11087	3696.3	-217.1	83.8
359.0	717522	153007	11171	3704.4	-223.1	84.2
360.0	721231	152780	11255	3712.4	-229.1	84.6

TABLE VII (U)

TIME SEC	EARTH-FIXED-POSITION			EARTH-FIXED-VELOCITY		
	XE M	YE M	ZE M	DXE M/SEC	DYE M/SEC	DZE M/SEC
361.0	724947	152548	11340	3720.4	-235.1	84.9
362.0	728672	152310	11425	3728.5	-241.2	85.3
363.0	732404	152066	11511	3736.6	-247.1	85.6
364.0	736145	151816	11596	3744.7	-253.1	86.0
365.0	739894	151560	11682	3752.9	-259.2	86.3
366.0	743651	151298	11769	3761.0	-265.2	86.7
367.0	747416	151029	11856	3769.2	-271.2	87.1
368.0	751189	150755	11943	3777.4	-277.2	87.4
369.0	754971	150475	12031	3785.7	-283.2	87.7
370.0	758760	150189	12119	3793.9	-289.2	88.1
371.0	762558	149897	12207	3802.2	-295.3	88.5
372.0	766365	149598	12295	3810.4	-301.3	88.9
373.0	770179	149294	12385	3818.7	-307.3	89.2
374.0	774002	148984	12474	3827.0	-313.4	89.6
375.0	777833	148667	12564	3835.4	-319.5	89.9
376.0	781673	148345	12654	3843.8	-325.5	90.3
377.0	785521	148016	12744	3852.1	-331.5	90.7
378.0	789377	147682	12835	3860.5	-337.7	91.0
379.0	793242	147341	12926	3868.9	-343.7	91.4
380.0	797115	146994	13018	3877.4	-349.8	91.8
381.0	800997	146641	13110	3885.9	-355.9	92.2
382.0	804887	146282	13202	3894.3	-362.0	92.6
383.0	808785	145917	13295	3902.8	-368.2	92.9
384.0	812692	145546	13388	3911.3	-374.3	93.3
385.0	816508	145169	13482	3919.9	-380.4	93.7
386.0	820532	144785	13576	3928.5	-386.5	94.1
387.0	824465	144396	13670	3937.0	-392.6	94.4
388.0	828406	144000	13765	3945.6	-398.8	94.9
389.0	832356	143598	13860	3954.2	-405.0	95.3
390.0	836315	143190	13955	3962.9	-411.1	95.7
391.0	840282	142776	14051	3971.6	-417.3	96.0
392.0	844258	142355	14147	3980.3	-423.4	96.4
393.0	848242	141929	14244	3989.0	-429.6	96.9
394.0	852236	141496	14341	3997.7	-435.7	97.3
395.0	856238	141057	14438	4006.5	-441.9	97.6
396.0	860249	140612	14536	4015.3	-448.1	98.0
397.0	864268	140161	14634	4024.1	-454.3	98.4
398.0	868297	139704	14733	4032.9	-460.5	98.8
399.0	872334	139240	14832	4041.8	-466.7	99.2
400.0	876381	138770	14931	4050.8	-472.9	99.6

TABLE VII (U)

TIME SEC	EARTH-FIXED-POSITION			EARTH-FIXED-VELOCITY		
	XE M	YE M	ZE M	DXE M/SEC	DYE M/SEC	DZE M/SEC
401.0	880436	138294	15031	4059.7	-479.2	100.0
402.0	884500	137812	15131	4068.6	-485.4	100.4
403.0	888573	137324	15232	4077.6	-491.7	100.8
404.0	892655	136829	15333	4086.5	-498.1	101.2
405.0	896746	136328	15434	4095.6	-504.3	101.6
406.0	900846	135820	15536	4104.7	-510.7	102.0
407.0	904955	135306	15638	4113.7	-517.0	102.5
408.0	909074	134786	15741	4122.8	-523.4	103.2
409.0	913201	134259	15844	4132.0	-529.7	103.6
410.0	917338	133727	15947	4141.1	-536.1	103.6
411.0	921483	133187	16051	4150.3	-542.1	104.0
412.0	925638	132642	16155	4159.6	-548.8	104.5
413.0	929803	132090	16260	4158.8	-555.2	104.9
414.0	933976	131531	16365	4178.1	-561.6	105.3
415.0	938159	130966	16471	4187.4	-568.1	105.7
416.0	942351	130395	16577	4196.7	-574.6	106.1
417.0	946552	129817	16683	4206.1	-581.0	106.6
418.0	950763	129233	16790	4215.5	-587.5	107.0
419.0	954983	128642	16897	4225.0	-594.0	107.4
420.0	959213	128045	17005	4234.4	-600.5	107.9
421.0	963452	127441	17113	4243.8	-607.0	108.3
422.0	967701	126831	17221	4253.4	-613.4	108.7
423.0	971959	126214	17330	4262.9	-620.0	109.1
424.0	976226	125591	17439	4272.5	-626.5	109.6
425.0	980504	124961	17549	4282.1	-633.0	110.0
426.0	984791	124325	17659	4291.7	-639.5	110.4
427.0	989087	123682	17770	4301.3	-646.3	110.9
428.0	993393	123033	17881	4311.0	-652.8	111.3
429.0	997709	122376	17993	4320.7	-659.5	111.7
430.0	1002035	121714	18105	4330.4	-666.1	112.1
431.0	1006370	121044	18217	4340.2	-672.7	112.5
432.0	1010715	120368	18330	4350.0	-679.3	113.0
433.0	1015070	119686	18443	4359.8	-686.0	113.4
434.0	1019435	118996	18556	4369.7	-692.7	113.9
435.0	1023810	118300	18671	4379.6	-699.4	114.3
436.0	1028194	117597	18785	4389.5	-706.2	114.7
437.0	1032588	116888	18900	4399.4	-712.9	115.2
438.0	1036993	116172	19015	4409.3	-719.6	115.7
439.0	1041407	115449	19131	4419.3	-726.3	116.1
440.0	1045831	114719	19248	4429.3	-733.1	116.6

TABLE VII (U)

TIME SEC	EARTH-FIXED-POSITION			EARTH-FIXED-VELOCITY		
	XE M	YE M	ZE M	DXE M/SEC	DYE M/SEC	DZE M/SEC
441.0	1050266	113982	19364	4439.3	-739.9	117.0
442.0	1054710	113239	19482	4449.4	-746.7	117.4
443.0	1059164	112489	19599	4459.5	-753.4	117.9
444.0	1063629	111732	19717	4469.6	-760.3	118.4
445.0	1068104	110969	19836	4479.8	-767.0	118.8
446.0	1072588	110198	19955	4490.0	-773.8	119.3
447.0	1077083	109421	20075	4500.1	-780.6	119.7
448.0	1081589	108637	20195	4510.4	-787.3	120.2
449.0	1086104	107846	20315	4520.6	-794.2	120.7
450.0	1090630	107049	20436	4530.9	-801.0	121.1
451.0	1095166	106244	20557	4541.2	-807.8	121.6
452.0	1099712	105433	20679	4551.6	-814.6	122.0
453.0	1104269	104615	20801	4561.9	-821.5	122.5
454.0	1108836	103790	20924	4572.3	-828.4	122.9
455.0	1113414	102958	21047	4582.7	-835.2	123.3
456.0	1118002	102120	21171	4593.2	-842.1	123.8
457.0	1122600	101274	21295	4603.7	-848.9	124.3
458.0	1127209	100422	21419	4614.2	-855.8	124.8
459.0	1131829	99562	21544	4624.8	-862.7	125.2
460.0	1136459	98696	21670	4635.3	-869.7	125.7
461.0	1141099	97823	21796	4645.9	-876.6	126.2
462.0	1145751	96943	21922	4656.6	-883.5	126.7
463.0	1150412	96056	22049	4667.3	-890.4	127.2
464.0	1155085	95162	22176	4678.0	-897.3	127.7
465.0	1159768	94261	22304	4688.7	-904.4	128.2
466.0	1164462	93353	22433	4699.4	-911.4	128.7
467.0	1169167	92438	22562	4710.2	-918.5	129.2
468.0	1173883	91517	22691	4721.0	-925.4	129.7
469.0	1178509	90588	22821	4731.9	-932.4	130.2
470.0	1183347	89652	22952	4742.8	-939.5	130.6
471.0	1188095	88709	23082	4753.8	-946.6	131.1
472.0	1192854	87759	23214	4764.7	-953.6	131.6
473.0	1197624	86801	23346	4775.7	-960.7	132.1
474.0	1202406	85837	23478	4786.8	-967.8	132.6
475.0	1207198	84866	23611	4797.9	-975.0	133.1
476.0	1212002	83887	23744	4809.0	-982.2	133.5
477.0	1216816	82901	23878	4820.2	-989.4	134.0
478.0	1221642	81908	24012	4831.4	-996.6	134.5
479.0	1226479	80908	24147	4842.6	-1003.8	135.0
480.0	1231327	79901	24282	4853.8	-1011.0	135.5

TABLE VII (U)

TIME SEC	EARTH-FIXED-POSITION			EARTH-FIXED-VELOCITY		
	XE M	YE M	ZE M	DXE M/SEC	DYE M/SEC	DZE M/SEC
481.0	1236187	78886	24418	4865.1	-1018.3	136.0
482.0	1241057	77864	24554	4876.4	-1025.5	136.5
483.0	1245939	76835	24691	4887.8	-1032.8	137.0
484.0	1250833	75798	24828	4899.3	-1040.2	137.5
485.0	1255738	74755	24966	4910.8	-1047.5	138.0
486.0	1260554	73703	25104	4922.3	-1054.9	138.5
487.0	1265582	72645	25243	4933.8	-1062.3	139.1
488.0	1270522	71579	25382	4945.4	-1069.7	139.6
489.0	1275473	70505	25522	4957.0	-1077.1	140.1
490.0	1280436	69425	25663	4968.7	-1084.6	140.6
491.0	1285411	68336	25803	4980.3	-1092.1	141.1
492.0	1290397	67241	25945	4992.1	-1099.5	141.6
493.0	1295395	66137	26087	5003.9	-1107.1	142.2
494.0	1300405	65026	26229	5015.7	-1114.6	142.7
495.0	1305426	63908	26372	5027.5	-1122.2	143.2
496.0	1310460	62782	26515	5039.4	-1129.7	143.7
497.0	1315505	61649	26659	5051.3	-1137.3	144.3
498.0	1320562	60507	26804	5063.2	-1144.9	144.8
499.0	1325631	59359	26949	5075.2	-1152.5	145.3
500.0	1330713	58202	27095	5087.2	-1160.2	145.8
501.0	1335806	57038	27241	5099.3	-1167.8	146.4
502.0	1340911	55867	27387	5111.4	-1175.5	146.9
503.0	1346029	54688	27534	5123.6	-1183.1	147.4
504.0	1351158	53501	27682	5135.8	-1190.7	148.0
505.0	1356300	52306	27830	5148.0	-1198.5	148.5
506.0	1361454	51104	27979	5160.3	-1206.3	149.1
507.0	1366621	49894	28129	5172.6	-1214.0	149.6
508.0	1371799	48676	28278	5184.9	-1221.7	150.1
509.0	1376990	47450	28429	5197.3	-1229.5	150.7
510.0	1382194	46217	28580	5209.6	-1237.3	151.2
511.0	1387410	44975	28731	5222.3	-1245.2	151.8
512.0	1392638	43726	28883	5234.8	-1253.1	152.3
513.0	1397880	42469	29036	5247.4	-1260.9	152.9
514.0	1403133	41204	29189	5260.0	-1268.8	153.4
515.0	1408400	39932	29343	5272.6	-1276.7	154.0
516.0	1413679	38651	29497	5285.3	-1284.6	154.6
517.0	1418970	37362	29652	5298.0	-1292.7	155.2
518.0	1424275	36066	29808	5310.9	-1300.7	155.8
519.0	1429592	34761	29954	5323.8	-1308.8	156.3
520.0	1434922	33448	30120	5336.7	-1316.7	156.9

TABLE VII (U)

TIME SEC	EARTH-FIXED-POSITION			EARTH-FIXED-VELOCITY		
	XE M	YE M	ZE M	DXE M/SEC	DYE M/SEC	DZE M/SEC
521.0	1440265	32127	30277	5349.7	-1324.8	157.5
522.0	1445621	30799	30435	5362.7	-1333.0	158.0
523.0	1450991	29461	30593	5375.7	-1341.1	158.6
524.0	1456373	28116	30752	5388.8	-1349.3	159.2
525.0	1461768	26763	30912	5401.9	-1357.5	159.7
526.0	1467177	25401	31072	5415.1	-1365.7	160.3
527.0	1472598	24031	31232	5428.3	-1373.9	160.9
528.0	1478033	22653	31393	5441.6	-1382.2	161.4
529.0	1483482	21267	31555	5454.9	-1390.4	162.1
530.0	1488943	19872	31718	5468.3	-1398.7	162.7
531.0	1494418	18470	31881	5481.7	-1407.0	163.3
532.0	1499907	17058	32044	5495.2	-1415.3	163.9
533.0	1505409	15639	32208	5508.7	-1423.6	164.4
534.0	1510924	14211	32373	5522.2	-1432.0	165.0
535.0	1516453	12775	32538	5535.8	-1440.5	165.5
536.0	1521996	11330	32704	5549.4	-1448.9	166.1
537.0	1527552	9877	32870	5563.1	-1457.3	166.7
538.0	1533122	8416	33037	5576.9	-1465.8	167.3
539.0	153706	6946	33205	5590.8	-1474.3	167.9
540.0	1544303	5467	33373	5604.6	-1482.8	168.5
541.0	1549915	3980	33542	5618.5	-1491.4	169.1
542.0	1555540	2484	33711	5632.5	-1500.0	169.7
543.0	1561180	280	33881	5646.5	-1508.5	170.3
544.0	1566833	-532	34052	5660.5	-1517.1	170.9
545.0	1572501	-2053	34223	5674.7	-1525.8	171.5
546.0	1578183	-3583	34395	5688.8	-1534.4	172.2
547.0	1583879	-5122	34558	5703.0	-1543.1	172.8
548.0	1589589	-6669	34741	5717.3	-1551.9	173.5
549.0	1595313	-8226	34915	5731.6	-1560.7	174.0
550.0	1601052	-9791	35089	5746.0	-1569.4	174.6
551.0	1606805	-11365	35264	5760.4	-1578.3	175.2
552.0	1612573	-12947	35439	5775.0	-1587.1	175.8
553.0	1618355	-14539	35615	5789.5	-1596.0	176.4
554.0	1624152	-16139	35792	5804.0	-1604.8	177.1
555.0	1629963	-17749	35970	5818.7	-1613.7	177.7
556.0	1635789	-19367	36148	5833.4	-1622.7	178.3
557.0	1641630	-20994	36326	5848.2	-1631.7	178.9
558.0	1647486	-22630	36505	5863.1	-1640.7	179.6
559.0	1653356	-24275	36685	5878.0	-1649.8	180.2
560.0	1659242	-25930	36866	5893.0	-1658.8	180.8

TABLE VII (U)

TIME SEC	EARTH-FIXED-POSITION			EARTH-FIXED-VELOCITY		
	XE M	YE M	ZE M	DXE M/SEC	DYE M/SEC	DZE M/SEC
561.0	1665142	-27593	37047	5908.1	-1668.0	181.5
562.0	1671058	-29266	37229	5923.2	-1677.1	182.1
563.0	1676988	-30947	37411	5938.4	-1686.4	182.8
564.0	1682934	-32638	37594	5953.6	-1695.7	183.4
565.0	1688896	-34339	37778	5968.9	-1705.0	184.1
566.0	1694872	-36048	37962	5984.3	-1714.3	184.7
567.0	1700864	-37767	38148	5999.8	-1723.7	185.4
568.0	1706872	-39496	38333	6015.3	-1733.1	186.0
569.0	1712895	-41234	38520	6030.9	-1742.6	186.7
570.0	1718934	-42981	38707	6046.6	-1752.1	187.3
571.0	1724988	-44738	38894	6062.3	-1761.6	188.0
572.0	1731058	-46504	39083	6078.0	-1771.2	188.7
573.0	1737144	-48280	39272	6093.8	-1780.9	189.4
574.0	1743246	-50066	39461	6109.7	-1790.6	190.1
575.0	1749363	-51851	39652	6125.7	-1800.3	190.7
576.0	1755497	-53667	39843	6141.7	-1810.2	191.4
577.0	1761547	-55482	40035	6157.8	-1819.9	192.0
578.0	1767813	-57307	40227	6174.0	-1829.8	192.7
579.0	1773995	-59141	40420	6190.2	-1839.7	193.3
580.0	1780193	-60986	40614	6206.6	-1849.6	194.0
581.0	1786408	-62841	40808	6223.0	-1859.5	194.7
582.0	1792639	-64705	41003	6239.5	-1869.5	195.4
583.0	1798887	-66580	41199	6256.0	-1879.6	196.1
584.0	1805151	-68464	41395	6272.6	-1889.7	196.8
585.0	1811432	-70359	41592	6289.4	-1899.8	197.5
586.0	1817730	-72264	41790	6306.2	-1909.9	198.2
587.0	1824044	-74179	41989	6323.0	-1920.0	198.9
588.0	1830376	-76104	42188	6339.9	-1930.3	199.6
589.0	1836724	-78039	42388	6356.9	-1940.6	200.3
590.0	1843090	-79985	42588	6374.0	-1950.9	201.0
591.0	1849472	-81941	42790	6391.1	-1961.2	201.7
592.0	1855872	-83907	42992	6408.3	-1971.6	202.4
593.0	1862289	-85884	43194	6425.6	-1981.9	203.1
594.0	1868723	-87871	43398	6443.0	-1992.3	203.8
595.0	1875175	-89869	43602	6460.4	-2002.8	204.5
596.0	1881644	-91877	43807	6477.8	-2013.4	205.2
597.0	1888131	-93896	44013	6495.5	-2024.0	206.0
598.0	1894635	-95925	44219	6513.2	-2034.6	206.7
599.0	1901157	-97965	44426	6530.9	-2045.4	207.4
600.0	1907697	-100016	44634	6548.8	-2056.1	208.1

TABLE VII (U)

TIME SEC	EARTH-FIXED-POSITION			EARTH-FIXED-VELOCITY		
	XE M	YE M	ZE M	DXE M/SEC	DYE M/SEC	DZE M/SEC
601.0	1914254	-102077	44842	6566.7	-2066.9	208.9
602.0	1920830	-104149	45051	6584.8	-2077.7	209.6
603.0	1927424	-106233	45261	6602.9	-2088.6	210.4
604.0	1934036	-108327	45472	6621.1	-2099.5	211.1
605.0	1940666	-110432	45684	6639.3	-2110.5	211.8
606.0	1947315	-112548	45896	6657.6	-2121.6	212.6
607.0	1953982	-114675	46109	6676.1	-2132.7	213.3
608.0	1960667	-116813	46323	6694.6	-2143.8	214.1
609.0	1967371	-118963	46537	5713.3	-2155.0	214.8
610.0	1974094	-121123	46752	5732.0	-2166.3	215.5
611.0	1980835	-123295	46968	5750.9	-2177.6	216.3
612.0	1987595	-125478	47185	5769.7	-2188.9	217.0
613.0	1994374	-127673	47402	5788.7	-2200.4	217.8
614.0	2001173	-129879	47620	5807.9	-2211.9	218.5
615.0	2007990	-132097	47839	5827.1	-2223.3	219.3
616.0	2014827	-134326	48059	5846.4	-2234.9	220.1
617.0	2021583	-136567	48279	5865.8	-2246.6	220.9
618.0	2028559	-138819	48501	5885.3	-2258.3	221.7
619.0	2035454	-141083	48723	5904.7	-2270.1	222.4
620.0	2042368	-143359	48946	5924.2	-2282.0	223.2
621.0	2049302	-145647	49169	5944.0	-2293.9	223.9
622.0	2056256	-147947	49393	5963.9	-2305.9	224.7
623.0	2063230	-150259	49618	5983.8	-2317.9	225.5
624.0	2070224	-152583	49844	7003.9	-2330.0	226.3
S-IV CUTOFF SIGNAL						
624.860	2076257	-154593	50039	7021.3	-2340.4	227.1
625.0	2077238	-154919	50071	7023.5	-2342.1	227.1
626.0	2084260	-157265	50298	7021.3	-2350.1	227.4
627.0	2091280	-159619	50526	7019.0	-2358.0	227.8
628.0	2098297	-161981	50754	7016.0	-2365.9	228.1
629.0	2105312	-164351	50982	7013.3	-2373.9	228.4
630.0	2112324	-166729	51211	7010.6	-2381.7	228.8
631.0	2119333	-169115	51440	7007.9	-2389.6	229.1
632.0	2126340	-171508	51669	7005.2	-2397.5	229.4
633.0	2133343	-173910	51899	7002.5	-2405.4	229.8
634.0	2140344	-176319	52129	6999.7	-2413.3	230.1
INSERTION						
634.860	2146363	-178398	52327	6997.4	-2420.1	230.4

TABLE VIII (U)

TIME SEC	SPACE-FIXED-POSITION			SPACE-FIXED-VELOCITY		
	XS M	YS M	ZS M	DXS M/SEC	DYS M/SEC	DZS M/SEC
FIRST MOTION						
0.170	0	0	0	395.0	0.0	-105.8
LIFTOFF SIGNAL						
0.400	91	0	-23	395.0	0.7	-105.8
1.0	328	1	-87	395.0	2.6	-105.8
2.0	723	5	-193	394.9	5.7	-105.8
3.0	1118	12	-299	394.9	8.9	-105.9
4.0	1513	23	-404	394.9	12.2	-106.0
5.0	1907	37	-511	394.8	15.6	-106.1
6.0	2302	54	-617	394.8	19.1	-106.1
7.0	2697	75	-723	394.8	22.8	-106.1
8.0	3092	100	-829	394.8	26.6	-106.2
9.0	3487	128	-935	394.7	30.4	-106.2
10.0	3881	161	-1041	394.7	34.3	-106.3
11.0	4276	197	-1148	394.7	38.3	-106.3
12.0	4671	237	-1254	394.6	42.4	-106.4
13.0	5066	282	-1361	394.6	46.6	-106.5
14.0	5460	330	-1467	394.6	50.8	-106.5
15.0	5855	383	-1574	394.6	55.2	-106.6
16.0	6249	441	-1681	394.7	59.7	-106.7
17.0	6644	503	-1787	394.9	64.3	-106.8
18.0	7039	569	-1894	395.2	69.0	-106.9
19.0	7434	641	-2001	395.6	73.9	-106.9
20.0	7830	717	-2108	396.3	78.7	-107.0
21.0	8226	798	-2215	397.2	83.5	-107.1
22.0	8623	885	-2322	398.3	88.4	-107.2
23.0	9022	976	-2429	399.7	93.2	-107.3
24.0	9422	1071	-2536	401.3	98.2	-107.3
25.0	9825	1172	-2644	403.1	103.3	-107.4
26.0	10229	1278	-2751	405.1	108.5	-107.4
27.0	10635	1389	-2858	407.4	113.7	-107.3
28.0	11044	1505	-2966	409.9	118.9	-107.3
29.0	11455	1627	-3073	412.6	124.2	-107.3
30.0	11869	1754	-3180	415.6	129.5	-107.3

TABLE VIII (U)

TIME SEC	SPACE-FIXED-POSITION			SPACE-FIXED-VELOCITY		
	XS M	YS M	ZS M	DXS M/SEC	DYS M/SEC	DZS M/SEC
31.0	12286	1886	-3288	418.8	134.9	-107.2
32.0	12707	2024	-3395	422.3	140.4	-107.2
33.0	13131	2167	-3502	426.1	145.9	-107.1
34.0	13559	2315	-3609	430.3	151.5	-107.0
35.0	13992	2470	-3716	434.9	157.0	-107.0
36.0	14429	2629	-3823	439.9	162.5	-107.0
37.0	14872	2795	-3930	445.3	168.0	-107.1
38.0	15320	2965	-4037	451.0	173.5	-107.1
39.0	15774	3142	-4144	456.8	179.0	-107.2
40.0	16233	3323	-4251	462.8	184.6	-107.2
41.0	16699	3511	-4359	468.9	190.2	-107.2
42.0	17171	3704	-4466	475.1	196.0	-107.2
43.0	17649	3903	-4573	481.3	201.8	-107.1
44.0	18134	4108	-4680	487.6	207.7	-107.1
45.0	18625	4318	-4787	493.9	213.7	-107.2
46.0	19122	4535	-4894	500.3	219.8	-107.2
47.0	19625	4758	-5002	506.7	226.0	-107.2
48.0	20135	4987	-5109	513.2	232.2	-107.3
49.0	20652	5222	-5216	519.9	239.5	-107.3
50.0	21175	5464	-5323	526.6	244.8	-107.3
51.0	21705	5712	-5431	533.6	251.2	-107.4
52.0	22242	5966	-5538	540.6	257.6	-107.5
53.0	22786	6227	-5646	547.7	264.0	-107.6
54.0	23338	6494	-5753	554.9	270.3	-107.7
MACH ONE						
54.705	23731	6686	-5829	550.1	274.6	-107.8
55.0	23896	6768	-5851	562.2	276.3	-107.8
56.0	24462	7047	-5969	569.6	282.2	-108.1
57.0	25036	7332	-6077	577.1	288.0	-108.5
58.0	25616	7623	-6186	584.6	293.7	-108.9
59.0	26205	7920	-6295	592.1	299.5	-109.2
60.0	26801	8222	-6404	599.7	305.5	-109.6
61.0	27404	8531	-6514	607.4	311.5	-110.1
62.0	28015	8845	-6625	615.3	317.7	-110.5
63.0	28635	9166	-6735	623.3	324.1	-111.0
64.0	29262	9493	-6846	631.5	330.7	-111.3
65.0	29898	9828	-6958	639.8	337.4	-111.5

TABLE VIII (U)

TIME SEC	SPACE-FIXED-POSITION			SPACE-FIXED-VELOCITY		
	XS M	YS M	ZS M	DXS M/SEC	DYS M/SEC	DZS M/SEC
66.0	30542	10168	-7070	647.9	344.6	-111.8
67.0	31194	10516	-7181	656.0	352.0	-112.0
68.0	31854	10871	-7293	664.3	359.5	-112.2
69.0	32523	11234	-7406	672.8	367.3	-112.3
70.0	33200	11604	-7518	681.5	375.2	-112.4
71.0	33885	11983	-7630	690.5	383.2	-112.4
72.0	34580	12370	-7743	699.9	391.4	-112.5
MAXIMUM DYNAMIC PRESSURE						
72.500	34931	12566	-7799	704.7	395.5	-112.5
73.0	35284	12765	-7855	709.7	399.7	-112.5
74.0	35998	13168	-7967	719.9	408.0	-112.5
75.0	36723	13580	-8080	730.7	416.4	-112.4
76.0	37459	14002	-8192	742.3	424.7	-112.4
77.0	38207	14431	-8304	754.6	432.9	-112.4
78.0	38968	14868	-8417	767.2	441.3	-112.3
79.0	39741	15314	-8529	780.1	449.9	-112.0
80.0	40528	15768	-8641	793.5	458.6	-111.8
81.0	41328	16231	-8752	807.3	467.4	-111.6
82.0	42143	16703	-8864	821.5	476.3	-111.4
83.0	42971	17184	-8975	836.2	485.3	-111.4
84.0	43815	17674	-9086	851.3	494.4	-111.5
85.0	44674	18173	-9198	866.9	503.6	-111.5
86.0	45548	18682	-9309	882.9	513.0	-111.6
87.0	46439	19200	-9421	899.4	522.4	-111.7
88.0	47347	19727	-9533	916.4	531.9	-111.7
89.0	48272	20264	-9645	933.9	541.4	-111.9
90.0	49215	20810	-9756	951.9	550.9	-112.1
91.0	50176	21366	-9869	970.7	560.4	-112.2
92.0	51156	21931	-9981	990.0	569.8	-112.3
93.0	52156	22506	-10093	1010.0	579.2	-112.3
94.0	53176	23090	-10205	1030.4	588.6	-112.2
95.0	54217	23684	-10318	1051.3	598.0	-112.2
96.0	55278	24287	-10430	1072.6	607.5	-112.3
97.0	56362	24899	-10542	1094.4	616.9	-112.4
98.0	57467	25521	-10655	1116.8	626.4	-112.5
99.0	58595	26152	-10767	1139.8	635.8	-112.5
100.0	59747	26793	-10880	1163.4	645.2	-112.5

TABLE VIII. (U)

TIME SEC	SPACE-FIXED-POSITION			SPACE-FIXED-VELOCITY		
	X <sub>S</sub> M	Y <sub>S</sub> M	Z <sub>S</sub> M	DX <sub>S</sub> M/SEC	DY <sub>S</sub> M/SEC	DZ <sub>S</sub> M/SEC
101.0	60922	27443	-10992	1187.4	654.6	-112.6
102.0	62122	28103	-11105	1212.0	664.0	-112.6
103.0	63346	28772	-11217	1237.1	673.5	-112.6
104.0	64596	29450	-11330	1262.5	683.0	-112.6
105.0	65871	30138	-11442	1288.5	692.6	-112.7
106.0	67173	30836	-11555	1315.0	702.2	-112.7
107.0	68502	31543	-11668	1342.0	711.8	-112.8
108.0	69857	32260	-11781	1369.5	721.5	-112.9
109.0	71241	32986	-11894	1397.5	731.1	-112.9
110.0	72652	33722	-12007	1426.1	740.8	-112.9
111.0	74093	34468	-12120	1455.2	750.6	-112.9
112.0	75563	35224	-12233	1484.9	760.3	-113.0
113.0	77063	35989	-12346	1515.0	770.0	-113.0
114.0	78593	36764	-12459	1545.9	779.7	-113.1
115.0	80155	37549	-12572	1577.3	789.4	-113.3
116.0	81749	38343	-12686	1609.2	799.2	-113.4
117.0	83374	39147	-12799	1641.8	808.8	-113.3

## ENGINE EIGHT PREMATURE SHUTDOWN

117.280	83836	39374	-12831	1650.9	811.4	-113.3
118.0	85031	39959	-12912	1671.9	816.8	-113.3
119.0	86718	40780	-13026	1701.3	824.1	-113.1
120.0	88434	41607	-13139	1731.1	831.2	-113.0
121.0	90181	42442	-13252	1761.3	838.3	-112.9
122.0	91958	43284	-13365	1792.0	845.4	-112.8
123.0	93766	44133	-13478	1823.4	852.4	-112.7
124.0	95605	44989	-13591	1855.1	859.5	-112.6
125.0	97477	45851	-13703	1887.5	866.4	-112.5
126.0	99381	46721	-13816	1920.5	873.3	-112.5
127.0	101319	47597	-13928	1953.9	880.1	-112.4
128.0	103290	48481	-14041	1988.0	886.9	-112.4
129.0	105295	49371	-14153	2022.7	893.5	-112.3
130.0	107336	50267	-14266	2058.0	900.0	-112.2
131.0	109412	51170	-14378	2093.9	906.6	-112.2
132.0	111525	52080	-14490	2130.4	913.1	-112.1
133.0	113674	52996	-14603	2167.7	919.7	-112.1
134.0	115861	53918	-14715	2205.5	926.2	-112.1
135.0	118085	54847	-14827	2243.9	933.0	-112.1

TABLE VIII (U)

TIME SEC	SPACE-FIXED-POSITION			SPACE-FIXED-VELOCITY		
	XS M	YS M	ZS M	DXS M/SEC	DYS M/SEC	DZS M/SEC
136.0	120349	55783	-14939	2282.7	940.9	-112.1
137.0	122652	56726	-15051	2322.1	947.2	-112.0
138.0	124994	57676	-15163	2362.3	954.8	-112.0
139.0	127377	58634	-15275	2403.0	962.5	-112.1
140.0	129801	59600	-15387	2444.3	970.7	-112.1
141.0	132267	60574	-15499	2486.2	979.1	-112.2
142.0	134776	61557	-15612	2528.6	987.7	-112.6
143.0	137326	62548	-15724	2571.9	996.7	-112.6
<b>I E C Ø</b>						
143.230	137922	62778	-15750	2582.0	998.9	-112.6
144.0	139913	63545	-15836	2606.6	1002.2	-112.7
145.0	142534	64548	-15949	2632.2	1003.7	-112.8
146.0	145179	65551	-16061	2657.4	1005.1	-112.8
147.0	147849	66556	-16173	2682.8	1006.4	-112.8
148.0	150545	67562	-16286	2708.3	1007.9	-112.7
149.0	153265	68561	-16397	2734.2	1009.4	-112.8
<b>Ø E C Ø</b>						
149.230	153898	68806	-16424	2740.1	1009.9	-112.8
150.0	156004	69583	-16504	2747.9	1005.0	-112.3
151.0	158752	70583	-16616	2748.6	995.6	-112.4
<b>S-IV IGNITION</b>						
151.310	159604	70891	-16651	2748.8	992.7	-112.4
152.0	161501	71574	-16728	2749.1	986.1	-112.4
153.0	164250	72556	-16841	2751.0	977.3	-112.5
154.0	167003	73529	-16953	2755.3	969.6	-112.6
155.0	169762	74495	-17066	2761.1	962.5	-112.7
156.0	172525	75454	-17179	2766.7	955.4	-112.8
157.0	175295	76406	-17291	2772.2	948.3	-112.8
158.0	178070	77351	-17404	2777.7	941.3	-112.8
159.0	180850	78289	-17517	2783.3	934.3	-112.8
160.0	183637	79220	-17630	2788.8	927.3	-112.8

TABLE VIII (U)

TIME SEC	SPACE-FIXED-POSITION			SPACE-FIXED-VELOCITY		
	XS M	YS M	ZS M	DXS M/SEC	DYS M/SEC	DZS M/SEC
161.0	186428	80143	-17743	2794.3	920.1	-112.9
162.0	189225	81060	-17856	2800.0	913.1	-112.9
163.0	192028	81970	-17969	2805.8	906.3	-113.0
164.0	194837	82872	-18082	2811.7	899.4	-113.0
165.0	197651	83768	-18195	2817.5	892.4	-113.0
166.0	200472	84657	-18308	2823.3	885.6	-113.1
167.0	203298	85540	-18421	2829.2	878.7	-113.2
168.0	206130	86415	-18534	2835.0	871.8	-113.2
169.0	208968	87283	-18647	2840.9	865.0	-113.3
170.0	211812	88145	-18761	2846.7	858.2	-113.3
171.0	214662	89000	-18874	2852.6	851.4	-113.3
172.0	217517	89847	-18987	2858.4	844.6	-113.1
173.0	220378	90689	-19100	2864.1	838.0	-112.7
174.0	223245	91523	-19213	2869.9	831.5	-112.3
175.0	226118	92352	-19325	2875.6	825.0	-111.7
176.0	228996	93173	-19436	2881.2	818.5	-111.0
177.0	231881	93989	-19547	2886.9	812.2	-110.4
178.0	234770	94798	-19657	2892.6	805.8	-109.7
179.0	237666	95600	-19766	2898.3	799.3	-109.1
180.0	240567	96396	-19875	2904.0	792.8	-108.5
181.0	243474	97186	-19983	2909.7	786.5	-107.9
182.0	246386	97969	-20091	2915.5	780.1	-107.4
183.0	249305	98746	-20198	2921.2	773.7	-106.8
184.0	252229	99517	-20304	2927.0	767.2	-106.4
185.0	255159	100281	-20410	2932.8	760.8	-105.9
186.0	258094	101038	-20516	2938.5	754.3	-105.5
187.0	261036	101789	-20622	2944.4	747.9	-105.1
188.0	263983	102534	-20726	2950.2	741.4	-104.6
189.0	266936	103272	-20831	2956.1	734.9	-104.2
190.0	269895	104004	-20935	2961.9	728.4	-103.8
191.0	272860	104729	-21038	2967.8	721.9	-103.4
192.0	275831	105447	-21142	2973.7	715.3	-103.0
193.0	278807	106159	-21244	2979.6	708.8	-102.6
194.0	281790	106865	-21347	2985.5	702.3	-102.3
195.0	284779	107564	-21449	2991.5	695.8	-101.9
196.0	287773	108257	-21551	2997.4	689.2	-101.6
197.0	290773	108942	-21652	3003.4	682.8	-101.3
198.0	293780	109622	-21753	3009.3	676.2	-101.0
199.0	296792	110295	-21854	3015.3	669.8	-100.7
200.0	299810	110962	-21955	3021.3	663.2	-100.4

TABLE VIII (U)

TIME SEC	SPACE-FIXED-POSITION			SPACE-FIXED-VELOCITY		
	XS M	YS M	ZS M	DXS M/SEC	DYS M/SEC	DZS M/SEC
201.0	302835	111622	-22055	3027.2	656.8	-100.2
202.0	305865	112275	-22155	3033.2	650.3	-99.9
203.0	308901	112922	-22255	3039.2	643.9	-99.6
204.0	311943	113563	-22354	3045.2	637.4	-99.4
205.0	314991	114197	-22454	3051.2	630.9	-99.2
206.0	318046	114825	-22553	3057.2	624.5	-99.0
207.0	321106	115446	-22652	3063.2	618.0	-98.8
208.0	324172	116061	-22750	3069.2	611.6	-98.6
209.0	327244	116669	-22849	3075.3	605.1	-98.5
210.0	330323	117271	-22947	3081.3	598.7	-98.3
211.0	333407	117866	-23045	3087.4	592.3	-98.1
212.0	336497	118456	-23143	3093.4	585.9	-98.0
213.0	339594	119038	-23241	3099.5	579.5	-97.8
214.0	342696	119615	-23339	3105.6	573.1	-97.7
215.0	345805	120194	-23437	3111.7	566.6	-97.6
216.0	348920	120748	-23534	3117.8	560.2	-97.4
217.0	352041	121305	-23632	3123.9	553.8	-97.3
218.0	355168	121856	-23729	3130.1	547.4	-97.2
219.0	358301	122400	-23826	3136.2	541.0	-97.1
220.0	361440	122938	-23923	3142.4	534.6	-97.0
221.0	364586	123469	-24020	3148.6	528.1	-96.9
222.0	367737	123994	-24117	3154.8	521.7	-96.9
223.0	370895	124512	-24214	3151.0	515.2	-96.9
224.0	374059	125024	-24311	3167.2	508.8	-96.8
225.0	377229	125530	-24408	3173.4	502.3	-96.7
226.0	380406	126029	-24504	3179.7	495.9	-96.7
227.0	383589	126521	-24601	3185.9	489.5	-96.7
228.0	386778	127008	-24698	3192.2	483.0	-96.6
229.0	389973	127487	-24794	3198.5	476.5	-96.6
230.0	393175	127961	-24891	3204.8	470.0	-96.5
231.0	396383	128427	-24987	3211.1	463.5	-96.5
232.0	399597	128888	-25084	3217.4	457.0	-96.5
233.0	402818	129342	-25180	3223.8	450.6	-96.5
234.0	406045	129789	-25277	3230.1	444.1	-96.5
235.0	409278	130230	-25373	3236.5	437.6	-96.5
236.0	412518	130664	-25470	3242.8	431.2	-96.4
237.0	415764	131092	-25566	3249.2	424.8	-96.4
238.0	419016	131514	-25663	3255.6	418.3	-96.4
239.0	422275	131929	-25759	3262.0	411.8	-96.4
240.0	425540	132337	-25855	3268.4	405.4	-96.4

TABLE VIII (U)

TIME SEC	SPACE-FIXED-POSITION			SPACE-FIXED-VELOCITY		
	XS M	YS M	ZS M	DXS M/SEC	DYS M/SEC	DZS M/SEC
241.0	428811	132740	-25952	3274.8	399.0	-96.5
242.0	432089	133135	-26048	3281.1	392.5	-96.5
243.0	435374	133525	-26145	3287.6	386.1	-96.5
244.0	438665	133908	-26241	3294.0	379.8	-96.5
245.0	441962	134284	-26338	3300.4	373.3	-96.5
246.0	445265	134654	-26434	3306.9	366.9	-96.6
247.0	448576	135018	-26531	3313.4	360.4	-96.6
248.0	451892	135375	-26628	3319.8	354.0	-96.6
249.0	455215	135726	-26724	3326.3	347.6	-96.6
250.0	458545	136070	-26821	3332.7	341.2	-96.6
251.0	461881	136408	-26918	3339.2	334.9	-96.7
252.0	465223	136740	-27014	3345.7	328.4	-96.7
253.0	468572	137065	-27111	3352.2	322.0	-96.7
254.0	471928	137384	-27208	3358.7	315.6	-96.8
255.0	475290	137697	-27305	3365.2	309.2	-96.8
256.0	478658	138003	-27401	3371.7	302.8	-96.9
257.0	482033	138302	-27498	3378.3	296.4	-96.9
258.0	485415	138595	-27595	3384.8	290.0	-96.9
259.0	488803	138882	-27692	3391.4	283.6	-97.0
260.0	492197	139162	-27789	3397.9	277.2	-97.0
261.0	495598	139436	-27886	3404.5	270.8	-97.1
262.0	499006	139704	-27983	3411.0	264.3	-97.1
263.0	502420	139965	-28080	3417.6	258.0	-97.2
264.0	505841	140220	-28178	3424.1	251.7	-97.2
265.0	509269	140468	-28275	3430.7	245.3	-97.3
266.0	512703	140711	-28372	3437.3	238.9	-97.3
267.0	516143	140946	-28470	3443.9	232.5	-97.4
268.0	519590	141176	-28567	3450.4	226.1	-97.4
269.0	523044	141398	-28654	3457.1	219.8	-97.4
270.0	526505	141615	-28752	3463.7	213.5	-97.5
271.0	529971	141825	-28859	3470.3	207.1	-97.5
272.0	533445	142029	-28957	3476.9	200.7	-97.6
273.0	536925	142227	-29055	3483.6	194.3	-97.6
274.0	540412	142418	-29152	3490.3	188.0	-97.7
275.0	543906	142603	-29250	3497.0	181.6	-97.7
276.0	547406	142791	-29348	3503.6	175.2	-97.8
277.0	550913	142953	-29445	3510.3	168.9	-97.8
278.0	554427	143119	-29543	3517.1	162.6	-97.8
279.0	557947	143278	-29641	3523.8	156.2	-97.9
280.0	561475	143431	-29739	3530.5	149.9	-97.9

TABLE VIII (U)

TIME SEC	SPACE-FIXED-POSITION			SPACE-FIXED-VELOCITY		
	XS M	YS M	ZS M	DXS M/SEC	DYS M/SEC	DZS M/SEC
281.0	565008	143578	-29837	3537.2	143.5	-98.0
282.0	568549	143718	-29935	3544.0	137.1	-98.0
283.0	572096	143852	-30033	3550.7	130.8	-98.1
284.0	575650	143980	-30131	3557.5	124.4	-98.1
285.0	579211	144101	-30229	3564.2	118.2	-98.1
286.0	582779	144216	-30327	3570.9	111.8	-98.1
287.0	586353	144325	-30425	3577.7	105.5	-98.2
288.0	589934	144427	-30524	3584.4	99.2	-98.2
289.0	593522	144523	-30622	3591.2	92.9	-98.3
290.0	597117	144613	-30720	3598.0	86.6	-98.3
291.0	600718	144696	-30819	3604.8	80.2	-98.4
292.0	604326	144773	-30917	3611.6	73.9	-98.4
293.0	607941	144844	-31015	3618.4	67.6	-98.4
294.0	611563	144908	-31114	3625.3	61.3	-98.4
295.0	6115192	144966	-31212	3632.1	55.0	-98.5
296.0	618827	145018	-31311	3638.9	48.6	-98.5
297.0	622470	145064	-31409	3645.8	42.3	-98.5
298.0	626119	145103	-31508	3652.6	36.0	-98.6
299.0	629775	145136	-31606	3659.5	29.7	-98.6
300.0	633438	145162	-31705	3666.3	23.4	-98.6
301.0	637108	145183	-31804	3673.2	17.0	-98.7
302.0	640784	145196	-31902	3680.1	10.7	-98.7
303.0	644468	145204	-32001	3687.1	4.4	-98.7
304.0	648158	145205	-32100	3694.0	-1.9	-98.7
305.0	651856	145200	-32198	3701.0	-8.3	-98.8
306.0	655560	145189	-32297	3708.0	-14.7	-98.8
307.0	659272	145171	-32396	3715.0	-21.0	-98.8
308.0	662990	145147	-32495	3722.0	-27.4	-98.8
309.0	666716	145116	-32594	3729.1	-33.7	-98.9
310.0	670448	145079	-32693	3736.1	-40.0	-98.9
311.0	674188	145036	-32791	3743.2	-46.5	-98.9
312.0	677935	144986	-32890	3750.3	-52.9	-98.9
313.0	681689	144930	-32989	3757.4	-59.3	-98.9
314.0	685449	144868	-33088	3764.5	-65.7	-98.9
315.0	689218	144799	-33187	3771.7	-72.1	-98.9
316.0	692993	144723	-33286	3778.8	-78.5	-98.9
317.0	696775	144642	-33385	3785.9	-85.0	-99.0
318.0	700565	144553	-33484	3793.1	-91.4	-99.0
319.0	704361	144459	-33583	3800.3	-97.8	-99.0
320.0	708165	144358	-33682	3807.5	-104.2	-99.0

TABLE VIII (U)

TIME SEC	SPACE-FIXED-POSITION			SPACE-FIXED-VELOCITY		
	XS M	YS M	ZS M	DXS M/SEC	DYS M/SEC	DZS M/SEC
321.0	711976	144250	-33781	3814.7	-110.6	-99.0
322.0	715795	144136	-33880	3821.9	-117.1	-99.0
323.0	719620	144016	-33979	3829.2	-123.5	-99.0
324.0	723453	143890	-34078	3836.5	-129.9	-99.0
325.0	727293	143757	-34177	3843.7	-136.4	-99.0
326.0	731141	143617	-34276	3851.0	-142.9	-99.0
327.0	734995	143471	-34375	3858.4	-149.3	-99.0
328.0	738857	143318	-34474	3865.7	-155.7	-99.0
329.0	742727	143159	-34573	3873.1	-162.2	-99.0
330.0	746603	142994	-34672	3880.4	-168.7	-99.0
331.0	750488	142822	-34771	3887.8	-175.2	-99.0
332.0	754379	142643	-34870	3895.2	-181.6	-99.0
333.0	758278	142459	-34969	3902.7	-188.1	-99.0
334.0	762184	142267	-35068	3910.1	-194.7	-99.0
335.0	766098	142069	-35167	3917.5	-201.3	-99.0
336.0	770019	141865	-35266	3924.9	-207.8	-99.0
337.0	773948	141654	-35365	3932.4	-214.2	-99.0
338.0	777884	141436	-35464	3940.0	-220.7	-99.0
339.0	781828	141212	-35563	3947.5	-227.2	-99.0
340.0	785779	140982	-35662	3955.0	-233.8	-99.0
341.0	789738	140745	-35761	3962.5	-240.4	-99.0
342.0	793704	140501	-35860	3970.1	-246.9	-99.0
343.0	797678	140251	-35959	3977.7	-253.4	-98.9
344.0	801660	139994	-36058	3985.3	-260.0	-98.9
345.0	805649	139731	-36157	3992.9	-266.5	-98.9
346.0	809645	139461	-36256	4000.5	-273.1	-98.9
347.0	813650	139185	-36354	4008.2	-279.7	-98.9
348.0	817662	138902	-36453	4015.5	-286.2	-98.8
349.0	821681	138612	-36552	4023.5	-292.8	-98.8
350.0	825709	138316	-36651	4031.2	-299.3	-98.8
351.0	829744	138014	-36750	4038.9	-305.9	-98.8
352.0	833787	137705	-36849	4046.7	-312.5	-98.8
353.0	837837	137389	-36947	4054.4	-319.1	-98.8
354.0	841896	137066	-37046	4062.2	-325.7	-98.8
355.0	845962	136737	-37145	4069.9	-332.4	-98.7
356.0	850035	136402	-37244	4077.8	-339.0	-98.7
357.0	854117	136059	-37342	4085.6	-345.6	-98.6
358.0	858207	135710	-37441	4093.5	-352.2	-98.7
359.0	862304	135355	-37540	4101.3	-358.9	-98.6
360.0	866409	134993	-37638	4109.2	-365.6	-98.6

TABLE VIII (U)

TIME SEC	SPACE-FIXED-POSITION			SPACE-FIXED-VELOCITY		
	XS M	YS M	ZS M	DXS M/SEC	DYS M/SEC	DZS M/SEC
361.0	870522	134624	-37737	4117.1	-372.2	-98.5
362.0	874643	134248	-37835	4125.0	-379.0	-98.5
363.0	878772	133866	-37934	4132.9	-385.6	-98.5
364.0	882909	133477	-38032	4140.8	-392.2	-98.5
365.0	887054	133081	-38131	4148.8	-399.0	-98.5
366.0	891207	132679	-38229	4156.8	-405.7	-98.4
367.0	895368	132270	-38328	4164.7	-412.3	-98.4
368.0	899536	131854	-38426	4172.8	-419.0	-98.3
369.0	903713	131432	-38524	4180.8	-425.7	-98.3
370.0	907898	131003	-38623	4188.9	-432.4	-98.3
371.0	912091	130567	-38721	4196.9	-439.1	-98.3
372.0	916292	130125	-38819	4205.0	-445.9	-98.2
373.0	920501	129675	-38917	4213.1	-452.6	-98.2
374.0	924718	129219	-39016	4221.3	-459.3	-98.2
375.0	928943	128757	-39114	4229.4	-466.1	-98.2
376.0	933177	128287	-39212	4237.6	-472.8	-98.2
377.0	937419	127811	-39310	4245.8	-479.5	-98.1
378.0	941668	127328	-39408	4253.9	-486.4	-98.1
379.0	945926	126839	-39506	4262.2	-493.1	-98.0
380.0	950193	126342	-39604	4270.5	-499.9	-98.0
381.0	954467	125839	-39702	4278.7	-506.7	-97.9
382.0	958750	125329	-39800	4286.9	-513.5	-97.9
383.0	963041	124812	-39898	4295.2	-520.3	-97.9
384.0	967341	124288	-39996	4303.5	-527.2	-97.8
385.0	971648	123757	-40094	4311.9	-534.0	-97.8
386.0	975964	123220	-40191	4320.3	-540.8	-97.8
387.0	980289	122676	-40289	4328.6	-547.7	-97.7
388.0	984622	122125	-40387	4337.0	-554.6	-97.7
389.0	988963	121567	-40484	4345.4	-561.4	-97.6
390.0	993312	121002	-40582	4353.9	-568.3	-97.6
391.0	997671	120430	-40680	4362.3	-575.2	-97.5
392.0	1002037	119852	-40777	4370.8	-582.1	-97.5
393.0	1006412	119266	-40875	4379.3	-588.9	-97.4
394.0	1010796	118674	-40972	4387.8	-595.8	-97.4
395.0	1015188	118074	-41069	4396.4	-602.7	-97.3
396.0	1019589	117468	-41167	4405.0	-609.6	-97.3
397.0	1023998	116855	-41264	4413.5	-616.5	-97.3
398.0	1028416	116235	-41361	4422.1	-623.5	-97.3
399.0	1032842	115608	-41459	4430.8	-630.4	-97.2
400.0	1037277	114974	-41556	4439.5	-637.4	-97.1

TABLE VIII (U)

TIME SEC	SPACE-FIXED-POSITION			SPACE-FIXED-VELOCITY		
	XS M	YS M	ZS M	DXS M/SEC	DYS M/SEC	DZS M/SEC
401.0	1041721	114333	-41653	4448.2	-644.4	-97.1
402.0	1046174	113686	-41750	4456.9	-651.4	-97.1
403.0	1050635	113031	-41847	4465.6	-658.4	-97.0
404.0	1055105	112369	-41944	4474.4	-665.5	-97.0
405.0	1059584	111700	-42041	4483.2	-672.6	-96.9
406.0	1064071	111024	-42138	4492.0	-679.6	-96.8
407.0	1068568	110340	-42235	4500.8	-686.7	-96.8
408.0	1073073	109650	-42331	4509.7	-693.8	-96.8
409.0	1077587	108953	-42428	4518.6	-700.9	-96.8
410.0	1082110	108248	-42525	4527.5	-708.1	-96.8
411.0	1086642	107537	-42622	4536.5	-715.2	-96.7
412.0	1091183	106818	-42718	4545.5	-722.3	-96.6
413.0	1095733	106092	-42815	4554.5	-729.5	-96.6
414.0	1100292	105359	-42911	4563.5	-736.7	-96.5
415.0	1104860	104618	-43008	4572.5	-743.9	-96.5
416.0	1109437	103871	-43104	4581.6	-751.2	-96.4
417.0	1114023	103116	-43201	4590.7	-758.4	-96.4
418.0	1118618	102354	-43297	4599.9	-765.7	-96.3
419.0	1123223	101585	-43393	4609.1	-773.0	-96.3
420.0	1127837	100808	-43490	4618.2	-780.3	-96.2
421.0	1132459	100024	-43586	4627.4	-787.6	-96.1
422.0	1137092	99233	-43682	4636.7	-794.8	-96.1
423.0	1141733	98435	-43778	4646.0	-802.2	-96.0
424.0	1146384	97629	-43874	4655.3	-809.5	-96.0
425.0	1151043	96815	-43970	4664.6	-816.8	-95.9
426.0	1155713	95995	-44066	4673.9	-824.2	-95.9
427.0	1160391	95167	-44162	4683.3	-831.6	-95.8
428.0	1165079	94332	-44257	4692.8	-839.0	-95.7
429.0	1169777	93489	-44353	4702.2	-846.4	-95.7
430.0	1174484	92639	-44449	4711.6	-853.8	-95.7
431.0	1179200	91781	-44545	4721.1	-861.3	-95.7
432.0	1183926	90916	-44640	4730.6	-868.7	-95.6
433.0	1188661	90044	-44736	4740.2	-876.3	-95.6
434.0	1193406	89164	-44831	4749.8	-883.6	-95.5
435.0	1198161	88276	-44927	4759.4	-891.3	-95.5
436.0	1202925	87381	-45022	4768.9	-898.9	-95.4
437.0	1207699	86479	-45118	4778.6	-906.5	-95.3
438.0	1212482	85568	-45213	4788.2	-914.0	-95.3
439.0	1217275	84651	-45308	4797.9	-921.5	-95.2
440.0	1222078	83725	-45403	4807.6	-929.1	-95.2

TABLE VIII (U)

TIME SEC	SPACE-FIXED-POSITION			SPACE-FIXED-VELOCITY		
	XS M	YS M	ZS M	DXS M/SEC	DYS M/SEC	DZS M/SEC
441.0	1226890	82792	-45499	4817.3	-936.7	-95.1
442.0	1231713	81852	-45594	4827.1	-944.4	-95.1
443.0	1236545	80904	-45689	4836.9	-952.0	-95.0
444.0	1241387	79948	-45784	4846.8	-959.7	-94.9
445.0	1246238	78984	-45879	4856.6	-967.3	-94.9
446.0	1251100	78013	-45973	4866.5	-975.0	-94.8
447.0	1255971	77034	-46068	4876.4	-982.5	-94.8
448.0	1260852	76048	-46163	4886.3	-990.2	-94.7
449.0	1265744	75054	-46258	4896.3	-997.9	-94.6
450.0	1270645	74052	-46352	4906.2	-1005.6	-94.6
451.0	1275556	73043	-46447	4916.2	-1013.2	-94.5
452.0	1280477	72026	-46541	4926.3	-1020.9	-94.5
453.0	1285409	71001	-46636	4936.3	-1028.7	-94.5
454.0	1290350	69968	-46730	4946.4	-1036.5	-94.4
455.0	1295302	68928	-46825	4956.5	-1044.1	-94.4
456.0	1300263	67880	-46919	4966.6	-1051.9	-94.3
457.0	1305235	66824	-47013	4976.8	-1059.6	-94.3
458.0	1310217	65761	-47107	4987.0	-1067.4	-94.2
459.0	1315209	64690	-47202	4997.2	-1075.2	-94.1
460.0	1320211	63611	-47296	5007.5	-1083.0	-94.1
461.0	1325224	62524	-47390	5017.8	-1090.8	-94.0
462.0	1330247	61429	-47484	5028.1	-1098.6	-93.9
463.0	1335280	60326	-47578	5038.4	-1106.4	-93.9
464.0	1340324	59216	-47671	5048.8	-1114.3	-93.8
465.0	1345378	58098	-47765	5059.2	-1122.2	-93.7
466.0	1350442	56972	-47859	5069.6	-1130.1	-93.6
467.0	1355517	55838	-47952	5080.0	-1138.1	-93.5
468.0	1360602	54696	-48046	5090.6	-1146.0	-93.5
469.0	1365698	53546	-48139	5101.1	-1153.9	-93.4
470.0	1370804	52388	-48233	5111.6	-1161.9	-93.3
471.0	1375921	51222	-48326	5122.3	-1169.9	-93.3
472.0	1381049	50048	-48419	5132.9	-1177.9	-93.2
473.0	1386187	48866	-48513	5143.5	-1185.9	-93.2
474.0	1391336	47676	-48606	5154.3	-1193.9	-93.1
475.0	1396495	46478	-48699	5165.0	-1202.0	-93.1
476.0	1401566	45272	-48792	5175.8	-1210.1	-93.1
477.0	1406847	44058	-48885	5186.6	-1218.3	-93.0
478.0	1412039	42836	-48978	5197.4	-1226.4	-92.9
479.0	1417242	41605	-49071	5208.2	-1234.6	-92.9
480.0	1422455	40366	-49154	5219.1	-1242.8	-92.8

TABLE VIII (U)

TIME SEC	SPACE-FIXED-POSITION			SPACE-FIXED-VELOCITY		
	XS M	YS M	ZS M	DXS M/SEC	DYS M/SEC	DZS M/SEC
481.0	1427680	39120	-49256	5230.0	-1251.0	-92.7
482.0	1432915	37864	-49349	5241.0	-1259.2	-92.7
483.0	1438162	36601	-49442	5252.0	-1267.4	-92.6
484.0	1443419	35330	-49534	5253.1	-1275.7	-92.6
485.0	1448688	34050	-49627	5274.2	-1284.1	-92.5
486.0	1453968	32762	-49719	5285.3	-1292.4	-92.4
487.0	1459259	31465	-49812	5296.5	-1300.8	-92.4
488.0	1464561	30160	-49904	5307.7	-1309.1	-92.3
489.0	1469874	28847	-49996	5319.0	-1317.5	-92.2
490.0	1475199	27525	-50088	5330.2	-1326.0	-92.2
491.0	1480535	26195	-50181	5341.5	-1334.4	-92.1
492.0	1485882	24856	-50273	5352.9	-1342.9	-92.0
493.0	1491241	23509	-50365	5364.3	-1351.4	-92.0
494.0	1496611	22153	-50457	5375.7	-1360.0	-91.9
495.0	1501992	20789	-50548	5387.1	-1368.5	-91.8
496.0	1507385	19416	-50640	5398.6	-1377.1	-91.8
497.0	1512789	18035	-50732	5410.1	-1385.7	-91.7
498.0	1518205	16645	-50824	5421.7	-1394.3	-91.6
499.0	1523633	15246	-50915	5433.2	-1402.9	-91.6
500.0	1529072	13839	-51007	5444.9	-1411.5	-91.5
501.0	1534522	12423	-51098	5456.5	-1420.2	-91.4
502.0	1539985	10999	-51190	5468.2	-1428.9	-91.4
503.0	1545459	9565	-51281	5480.0	-1437.5	-91.3
504.0	1550945	8124	-51372	5491.8	-1446.2	-91.2
505.0	1556442	6673	-51463	5503.6	-1455.0	-91.1
506.0	1561952	5214	-51554	5515.5	-1463.8	-91.1
507.0	1567473	3745	-51645	5527.4	-1472.5	-91.0
508.0	1573006	2268	-51736	5539.2	-1481.3	-90.9
509.0	1578552	783	-51827	5551.2	-1490.2	-90.9
510.0	1584109	-711	-51918	5563.3	-1499.1	-90.8
511.0	1589678	-2214	-52009	5575.3	-1507.9	-90.7
512.0	1595260	-3727	-52100	5587.5	-1516.9	-90.7
513.0	1600853	-5248	-52190	5599.6	-1525.8	-90.6
514.0	1606459	-6778	-52281	5611.8	-1534.7	-90.5
515.0	1612077	-8318	-52371	5624.0	-1543.7	-90.4
516.0	1617707	-9866	-52462	5636.2	-1552.7	-90.3
517.0	1623349	-11423	-52552	5648.5	-1561.8	-90.2
518.0	1629004	-12989	-52642	5660.9	-1570.9	-90.1
519.0	1634671	-14565	-52732	5673.3	-1580.1	-90.1
520.0	1640350	-16150	-52822	5685.8	-1589.1	-90.0

TABLE VIII (U)

TIME SEC	SPACE-FIXED-POSITION			SPACE-FIXED-VELOCITY		
	XS M	YS M	ZS M	DXS M/SEC	DYS M/SEC	DZS M/SEC
521.0	1646043	-17743	-52912	5698.4	-1598.3	-89.9
522.0	1651747	-19346	-53002	5710.9	-1607.5	-89.8
523.0	1657464	-20958	-53092	5723.5	-1616.8	-89.8
524.0	1663194	-22580	-53181	5736.1	-1626.1	-89.7
525.0	1668937	-24211	-53271	5748.8	-1635.4	-89.6
526.0	1674692	-25851	-53361	5761.5	-1644.7	-89.6
527.0	1680460	-27500	-53450	5774.3	-1654.0	-89.5
528.0	1686240	-29159	-53540	5787.1	-1663.4	-89.4
529.0	1692034	-30827	-53629	5799.9	-1672.8	-89.3
530.0	1697840	-32504	-53718	5812.8	-1682.1	-89.2
531.0	1703659	-34191	-53807	5825.8	-1691.6	-89.1
532.0	1709492	-35887	-53896	5838.8	-1701.0	-89.0
533.0	1715337	-37593	-53985	5851.8	-1710.5	-88.9
534.0	1721195	-39308	-54074	5864.8	-1720.0	-88.9
535.0	1727067	-41033	-54163	5877.9	-1729.6	-88.9
536.0	1732951	-42768	-54252	5891.1	-1739.2	-88.8
537.0	1738849	-44512	-54341	5904.3	-1748.8	-88.8
538.0	1744760	-46265	-54430	5917.6	-1758.4	-88.7
539.0	1750684	-48028	-54518	5930.9	-1768.0	-88.6
540.0	1756622	-49801	-54607	5944.3	-1777.7	-88.5
541.0	1762573	-51584	-54695	5957.7	-1787.5	-88.5
542.0	1768537	-53376	-54784	5971.2	-1797.2	-88.4
543.0	1774515	-55178	-54872	5984.7	-1807.0	-88.3
544.0	1780506	-56990	-54960	5998.2	-1816.7	-88.2
545.0	1786511	-58812	-55048	6011.8	-1826.6	-88.1
546.0	1792530	-60643	-55136	6025.5	-1836.4	-88.0
547.0	1798562	-62484	-55224	6039.2	-1846.3	-87.9
548.0	1804608	-64336	-55312	6052.9	-1856.3	-87.8
549.0	1810668	-66197	-55400	6066.7	-1866.3	-87.7
550.0	1816742	-68068	-55488	6080.6	-1876.2	-87.7
551.0	1822829	-69950	-55575	6094.5	-1886.3	-87.7
552.0	1828931	-71841	-55663	6108.5	-1896.4	-87.6
553.0	1835046	-73742	-55751	6122.5	-1906.4	-87.5
554.0	1841176	-75654	-55838	6136.5	-1916.5	-87.5
555.0	1847319	-77575	-55926	6150.6	-1926.6	-87.4
556.0	1853477	-79507	-56013	6164.8	-1936.8	-87.3
557.0	1859649	-81449	-56100	6179.1	-1947.0	-87.2
558.0	1865835	-83401	-56187	6193.4	-1957.3	-87.1
559.0	1872036	-85363	-56274	6207.8	-1967.6	-87.1
560.0	1878251	-87336	-56361	6222.3	-1977.9	-87.0

TABLE VIII (U)

TIME SEC	SPACE-FIXED-POSITION			SPACE-FIXED-VELOCITY		
	XS M	YS M	ZS M	DXS M/SEC	DYS M/SEC	DZS M/SEC
561.0	1884480	-89319	-56448	6236.7	-1988.3	-86.9
562.0	1890724	-91313	-56535	6251.3	-1998.8	-86.8
563.0	1896983	-93317	-56622	6265.9	-2009.3	-86.7
564.0	1903256	-95331	-56709	6280.6	-2019.9	-86.7
565.0	1909544	-97357	-56795	6295.3	-2030.5	-86.6
566.0	1915847	-99392	-56882	6310.2	-2041.1	-86.5
567.0	1922164	-101439	-56968	6325.0	-2051.7	-86.4
568.0	1928497	-103496	-57055	6340.0	-2062.4	-86.3
569.0	1934844	-105564	-57141	6355.0	-2073.2	-86.3
570.0	1941207	-107642	-57227	6370.1	-2084.0	-86.2
571.0	1947585	-109732	-57313	6385.3	-2094.8	-86.1
572.0	1953977	-111832	-57399	6400.4	-2105.8	-86.0
573.0	1960385	-113943	-57485	6415.5	-2116.8	-85.9
574.0	1966809	-116065	-57571	6430.8	-2127.8	-85.8
575.0	1973247	-118199	-57657	6446.2	-2138.9	-85.7
576.0	1979701	-120343	-57743	6461.7	-2150.0	-85.7
577.0	1986170	-122499	-57828	6477.1	-2161.1	-85.6
578.0	1992655	-124666	-57914	6492.7	-2172.3	-85.5
579.0	1999156	-126843	-57999	6508.4	-2183.6	-85.5
580.0	2005672	-129033	-58085	6524.1	-2194.9	-85.4
581.0	2012204	-131233	-58170	6539.9	-2206.1	-85.3
582.0	2018752	-133445	-58255	6555.7	-2217.5	-85.2
583.0	2025315	-135668	-58340	6571.7	-2228.9	-85.1
584.0	2031895	-137903	-58426	6587.7	-2240.4	-85.0
585.0	2038491	-140149	-58511	6603.7	-2251.9	-84.9
586.0	2045103	-142407	-58595	6619.9	-2263.4	-84.9
587.0	2051731	-144676	-58680	6636.1	-2274.9	-84.8
588.0	2058375	-146957	-58765	6652.3	-2286.6	-84.7
589.0	2065035	-149249	-58850	6668.7	-2298.3	-84.6
590.0	2071712	-151553	-58934	6685.1	-2310.0	-84.5
591.0	2078406	-153869	-59019	6701.6	-2321.7	-84.4
592.0	2085115	-156196	-59103	6718.1	-2333.5	-84.4
593.0	2091842	-158536	-59187	6734.8	-2345.3	-84.3
594.0	2098585	-160887	-59272	6751.5	-2357.2	-84.2
595.0	2105345	-163250	-59356	6768.2	-2369.1	-84.1
596.0	2112121	-165625	-59440	6785.0	-2381.1	-84.0
597.0	2118915	-168012	-59524	6802.0	-2393.2	-83.9
598.0	2125725	-170412	-59608	6819.0	-2405.3	-83.8
599.0	2132553	-172823	-59692	6836.1	-2417.5	-83.8
600.0	2139398	-175247	-59775	6853.2	-2429.7	-83.7

TABLE VIII (U)

TIME SEC	SPACE-FIXED-POSITION			SPACE-FIXED-VELOCITY		
	XS M	YS M	ZS M	DXS M/SEC	DYS M/SEC	DZS M/SEC
601.0	2146259	-177682	-59859	5870.5	-2442.0	-83.6
602.0	2153138	-180130	-59943	6887.8	-2454.3	-83.5
603.0	2160035	-182591	-60026	5905.3	-2466.6	-83.4
604.0	2166949	-185064	-60109	5922.7	-2479.0	-83.3
605.0	2173880	-187549	-60193	5940.3	-2491.5	-83.2
606.0	2180829	-190047	-60276	6957.9	-2504.1	-83.2
607.0	2187796	-192557	-60359	6975.6	-2516.8	-83.1
608.0	2194781	-195080	-60442	5993.4	-2529.4	-83.0
609.0	2201783	-197616	-60525	7011.3	-2542.1	-82.9
610.0	2208803	-200165	-60608	7029.4	-2554.9	-82.9
611.0	2215842	-202726	-60691	7047.4	-2567.8	-82.8
612.0	2222898	-205300	-60774	7065.5	-2580.7	-82.7
613.0	2229973	-207887	-60856	7083.8	-2593.7	-82.6
614.0	2237066	-210487	-60939	7102.2	-2606.7	-82.6
615.0	2244177	-213101	-61021	7120.7	-2619.8	-82.5
616.0	2251307	-215727	-61104	7139.2	-2632.9	-82.4
617.0	2258456	-218367	-61186	7157.9	-2646.2	-82.3
618.0	2265623	-221019	-61268	7176.6	-2659.5	-82.2
619.0	2272809	-223686	-61350	7195.3	-2672.9	-82.1
620.0	2280014	-226365	-61433	7214.0	-2686.3	-82.1
621.0	2287237	-229058	-61515	7232.9	-2699.9	-82.0
622.0	2294480	-231765	-61597	7252.1	-2713.5	-81.9
623.0	2301741	-234485	-61679	7271.2	-2727.2	-81.8
624.0	2309022	-237219	-61760	7290.5	-2740.9	-81.8
S-IV CUTOFF SIGNAL						
624.860	2315301	-239583	-61831	7307.2	-2752.7	-81.6
625.0	2316322	-239967	-61842	7309.4	-2754.6	-81.7
626.0	2323630	-242726	-61924	7306.5	-2763.3	-81.6
627.0	2330935	-245494	-62005	7303.5	-2772.1	-81.5
628.0	2338236	-248270	-62087	7299.9	-2780.8	-81.4
629.0	2345535	-251055	-62168	7296.6	-2789.5	-81.4
630.0	2352829	-253849	-62249	7293.2	-2798.1	-81.3
631.0	2360121	-256652	-62331	7289.9	-2806.7	-81.2
632.0	2367409	-259463	-62412	7286.6	-2815.4	-81.2
633.0	2374694	-262282	-62493	7283.2	-2824.0	-81.1
634.0	2381976	-265111	-62574	7279.8	-2832.7	-81.0
INSERTION						
634.860	2388235	-267551	-62644	7276.9	-2840.1	-80.9

TABLE IX (U)

TIME SEC	EARTH-FIXED-ACCELERATION			SPACE-FIXED-ACCELERATION		
	DDXE M/SEC SQ	DDYE M/SEC SQ	DDZE M/SEC SQ	DDXS M/SEC SQ	DDYS M/SEC SQ	DDZS M/SEC SQ
FIRST MOTION						
0.170	-0.04	3.20	0.10	-0.05	3.18	0.08
LIFTOFF SIGNAL						
0.400	-0.04	3.17	0.07	-0.04	3.15	0.05
1.0	-0.03	3.13	0.01	-0.03	3.11	-0.01
2.0	-0.03	3.16	-0.04	-0.03	3.13	-0.06
3.0	-0.03	3.25	-0.06	-0.03	3.23	-0.07
4.0	-0.03	3.38	-0.05	-0.03	3.35	-0.07
5.0	-0.03	3.51	-0.04	-0.03	3.48	-0.06
6.0	-0.03	3.63	-0.03	-0.03	3.60	-0.04
7.0	-0.03	3.73	-0.02	-0.03	3.71	-0.04
8.0	-0.03	3.83	-0.02	-0.03	3.80	-0.04
9.0	-0.04	3.91	-0.03	-0.03	3.88	-0.04
10.0	-0.04	3.99	-0.03	-0.04	3.96	-0.05
11.0	-0.04	4.07	-0.05	-0.04	4.04	-0.06
12.0	-0.04	4.15	-0.06	-0.03	4.13	-0.07
13.0	-0.02	4.25	-0.06	-0.02	4.22	-0.08
14.0	0.01	4.35	-0.07	0.01	4.33	-0.09
15.0	0.05	4.46	-0.07	0.06	4.44	-0.09
16.0	0.12	4.58	-0.07	0.13	4.55	-0.08
17.0	0.22	4.69	-0.06	0.23	4.66	-0.08
18.0	0.36	4.79	-0.06	0.37	4.76	-0.07
19.0	0.53	4.87	-0.05	0.54	4.84	-0.07
20.0	0.74	4.93	-0.05	0.75	4.90	-0.07
21.0	0.98	4.95	-0.05	0.99	4.92	-0.07
22.0	1.25	4.95	-0.05	1.26	4.92	-0.08
23.0	1.51	5.05	-0.05	1.52	5.03	-0.07
24.0	1.68	5.12	-0.02	1.70	5.09	-0.05
25.0	1.89	5.18	0.01	1.91	5.15	-0.01
26.0	2.12	5.23	0.04	2.14	5.20	0.02
27.0	2.37	5.27	0.05	2.39	5.24	0.02
28.0	2.62	5.30	0.04	2.64	5.26	0.01
29.0	2.85	5.33	0.04	2.87	5.30	0.01
30.0	3.08	5.38	0.06	3.10	5.34	0.03

TABLE IX (U)

TIME SEC	EARTH-FIXED-ACCELERATION			SPACE-FIXED-ACCELERATION		
	DDXE M/SEC SQ	DDYE M/SEC SQ	DDZE M/SEC SQ	DDXS M/SEC SQ	DDYS M/SEC SQ	DDZS M/SEC SQ
31.0	3.32	5.47	0.09	3.34	5.44	0.07
32.0	3.58	5.55	0.12	3.61	5.51	0.09
33.0	3.94	5.58	0.11	3.97	5.54	0.08
34.0	4.36	5.58	0.08	4.39	5.54	0.05
35.0	4.81	5.56	0.03	4.84	5.51	0.00
36.0	5.21	5.53	-0.00	5.24	5.49	-0.04
37.0	5.52	5.53	-0.02	5.55	5.49	-0.06
38.0	5.74	5.56	-0.02	5.77	5.51	-0.06
39.0	5.89	5.60	-0.00	5.92	5.55	-0.04
40.0	6.01	5.64	0.02	6.04	5.59	-0.01
41.0	6.11	5.74	0.06	6.14	5.69	0.02
42.0	6.17	5.82	0.07	6.21	5.77	0.03
43.0	6.21	5.92	0.06	6.25	5.86	0.02
44.0	6.25	5.99	0.02	6.29	5.94	-0.02
45.0	6.31	6.08	-0.01	6.35	6.03	-0.05
46.0	6.39	6.17	-0.01	6.43	6.11	-0.05
47.0	6.46	6.25	0.02	6.50	6.19	-0.02
48.0	6.53	6.32	0.04	6.57	6.26	-0.00
49.0	6.61	6.38	0.02	6.66	6.32	-0.03
50.0	6.73	6.43	-0.02	6.78	6.37	-0.07
51.0	6.89	6.45	-0.05	6.94	6.39	-0.10
52.0	7.02	6.46	-0.03	7.07	6.39	-0.08
53.0	7.14	6.43	-0.00	7.19	6.37	-0.06
54.0	7.25	6.32	-0.05	7.30	6.25	-0.11
MACH ONE						
54.705	7.32	6.20	-0.14	7.37	6.13	-0.19
55.0	7.35	6.14	-0.18	7.40	6.07	-0.23
56.0	7.40	5.84	-0.29	7.46	5.77	-0.35
57.0	7.43	5.67	-0.34	7.49	5.59	-0.40
58.0	7.44	5.79	-0.33	7.50	5.71	-0.39
59.0	7.45	5.94	-0.30	7.51	5.86	-0.36
60.0	7.49	6.08	-0.32	7.55	6.01	-0.38
61.0	7.66	6.22	-0.40	7.72	6.14	-0.46
62.0	7.91	6.36	-0.44	7.97	6.28	-0.50
63.0	8.10	6.54	-0.38	8.16	6.45	-0.44
64.0	8.20	6.75	-0.24	8.26	6.66	-0.30
65.0	8.22	7.01	-0.07	8.29	6.92	-0.13

TABLE IX (U)

TIME SEC	EARTH-FIXED-ACCELERATION			SPACE-FIXED-ACCELERATION		
	DDXE M/SEC SQ	DDYE M/SEC SQ	DDZE M/SEC SQ	DDXS M/SEC SQ	DDYS M/SEC SQ	DDZS M/SEC SQ
66.0	8.21	7.28	0.00	8.28	7.19	-0.07
67.0	8.23	7.52	-0.10	8.30	7.42	-0.17
68.0	8.29	7.75	-0.26	8.36	7.66	-0.33
69.0	8.36	8.00	-0.29	8.44	7.91	-0.36
70.0	8.50	8.25	-0.07	8.57	8.15	-0.14
71.0	8.73	8.41	0.20	8.81	8.31	0.12
72.0	9.20	8.51	0.36	9.28	8.40	0.26
MAXIMUM DYNAMIC PRESSURE						
72.500	9.53	8.50	0.34	9.61	8.39	0.26
73.0	9.89	8.46	0.26	9.98	8.35	0.18
74.0	10.69	8.35	0.05	10.77	8.24	-0.03
75.0	11.38	8.28	-0.09	11.46	8.16	-0.18
76.0	11.95	8.33	0.02	12.03	8.21	-0.08
77.0	12.34	8.46	0.21	12.43	8.34	0.11
78.0	12.68	8.64	0.32	12.78	8.50	0.22
79.0	13.05	8.77	0.33	13.15	8.64	0.23
80.0	13.49	8.89	0.35	13.59	8.75	0.25
81.0	13.91	8.99	0.30	14.01	8.84	0.19
82.0	14.32	9.10	0.20	14.42	8.95	0.08
83.0	14.77	9.20	0.08	14.87	9.05	-0.03
84.0	15.23	9.34	0.04	15.34	9.18	-0.08
85.0	15.69	9.46	0.05	15.80	9.29	-0.07
86.0	16.17	9.57	0.10	16.28	9.40	-0.02
87.0	16.64	9.63	0.08	16.75	9.45	-0.05
88.0	17.11	9.68	-0.01	17.22	9.49	-0.14
89.0	17.66	9.70	-0.07	17.77	9.51	-0.20
90.0	18.26	9.70	-0.07	18.38	9.50	-0.21
91.0	18.93	9.69	0.06	19.05	9.49	-0.09
92.0	19.55	9.65	0.17	19.67	9.44	0.02
93.0	20.08	9.58	0.18	20.21	9.37	0.03
94.0	20.55	9.59	0.19	20.67	9.37	0.03
95.0	20.97	9.65	0.16	21.10	9.42	-0.01
96.0	21.40	9.71	0.07	21.53	9.47	-0.10
97.0	21.94	9.72	0.05	22.07	9.48	-0.13
98.0	22.59	9.70	0.12	22.73	9.44	-0.05
99.0	23.19	9.67	0.16	23.32	9.41	-0.02
100.0	23.70	9.65	0.13	23.83	9.39	-0.05

TABLE IX (J)

TIME SEC	EARTH-FIXED-ACCELERATION			SPACE-FIXED-ACCELERATION		
	DDXE M/SEC SQ	DDYE M/SEC SQ	DDZE M/SEC SQ	DDXS M/SEC SQ	DDYS M/SEC SQ	DDZS M/SEC SQ
101.0	24.18	9.69	0.17	24.32	9.42	-0.02
102.0	24.66	9.73	0.20	24.80	9.45	0.00
103.0	25.12	9.78	0.19	25.27	9.49	-0.01
104.0	25.59	9.84	0.18	25.74	9.54	-0.03
105.0	26.07	9.88	0.14	26.22	9.58	-0.07
106.0	26.55	9.93	0.12	26.69	9.62	-0.10
107.0	27.07	9.96	0.14	27.22	9.64	-0.08
108.0	27.64	9.98	0.21	27.79	9.65	-0.02
109.0	28.19	10.00	0.23	28.34	9.66	-0.00
110.0	28.66	10.07	0.18	28.81	9.72	-0.05
111.0	29.05	10.07	0.19	29.21	9.71	-0.05
112.0	29.82	9.95	0.23	29.98	9.58	-0.02
113.0	30.41	10.06	0.24	30.57	9.68	-0.02
114.0	30.97	10.12	0.25	31.14	9.73	-0.02
115.0	31.50	10.12	0.25	31.67	9.73	-0.01
116.0	32.01	10.07	0.26	32.18	9.67	-0.01
117.0	32.48	9.96	0.27	32.65	9.55	-0.01
ENGINE EIGHT PREMATURE SHUTDOWN						
117.280	32.61	9.93	0.27	32.78	9.51	-0.01
118.0	28.89	7.70	0.26	29.04	7.31	-0.01
119.0	29.33	7.70	0.26	29.48	7.30	-0.00
120.0	29.83	7.54	0.27	29.99	7.12	-0.00
121.0	30.34	7.39	0.28	30.50	6.97	-0.00
122.0	30.86	7.27	0.28	31.02	6.84	0.00
123.0	31.39	7.18	0.29	31.54	6.73	0.00
124.0	31.92	7.10	0.30	32.08	6.65	0.00
125.0	32.46	7.04	0.31	32.62	6.58	0.00
126.0	33.00	7.01	0.31	33.16	6.54	0.01
127.0	33.55	7.00	0.32	33.71	6.52	0.01
128.0	34.11	7.01	0.33	34.27	6.52	0.01
129.0	34.68	7.04	0.33	34.84	6.54	0.01
130.0	35.25	7.10	0.34	35.42	6.58	0.01
131.0	35.85	7.18	0.35	36.02	6.65	0.01
132.0	36.42	7.27	0.36	36.59	6.73	0.01
133.0	37.01	7.39	0.36	37.18	6.84	0.01
134.0	37.61	7.53	0.37	37.78	6.97	0.01
135.0	38.22	7.69	0.38	38.39	7.12	0.01

TABLE IX (U)

TIME SEC	EARTH-FIXED-ACCELERATION			SPACE-FIXED-ACCELERATION		
	DDXE M/SEC SQ	DDYE M/SEC SQ	DDZE M/SEC SQ	DDXS M/SEC SQ	DDYS M/SEC SQ	DDZS M/SEC SQ
136.0	38.83	7.88	0.38	39.01	7.29	0.01
137.0	39.45	8.09	0.39	39.63	7.49	0.01
138.0	40.07	8.31	0.40	40.26	7.70	0.00
139.0	40.71	8.56	0.41	40.90	7.94	0.01
140.0	41.35	8.84	0.41	41.54	8.20	0.00
141.0	42.00	9.13	0.42	42.19	8.48	0.00
142.0	42.65	9.45	0.43	42.85	8.78	0.00
143.0	43.31	9.78	0.43	43.52	9.11	-0.00
 IECO						
143.230	43.46	9.86	0.44	43.67	9.18	-0.00
144.0	25.53	1.91	0.33	25.67	1.38	-0.00
145.0	25.37	1.91	0.33	25.51	1.38	-0.00
146.0	25.30	1.92	0.33	25.44	1.39	-0.01
147.0	25.33	1.93	0.33	25.47	1.39	-0.01
148.0	25.46	1.94	0.33	25.60	1.39	-0.01
149.0	25.70	1.95	0.33	25.84	1.40	-0.01
 DEC0						
149.230	25.77	1.95	0.33	25.91	1.40	-0.01
150.0	2.31	-7.28	0.22	2.37	-7.	0.02
151.0	0.73	-9.07	0.00	0.76	-9	-0.19
 S-IV IGNITION						
151.310	0.60	-9.07	0.13	0.64	-9.40	-0.06
152.0	0.72	-9.05	0.18	0.75	-9.37	-0.01
153.0	3.07	-7.84	0.14	3.12	-8.18	-0.06
154.0	5.44	-6.78	0.09	5.50	-7.15	-0.13
155.0	5.71	-6.74	0.13	5.77	-7.11	-0.09
156.0	5.47	-6.72	0.15	5.52	-7.09	-0.07
157.0	5.44	-6.66	0.19	5.49	-7.03	-0.03
158.0	5.46	-6.62	0.22	5.51	-7.00	0.00
159.0	5.49	-6.64	0.23	5.53	-7.01	0.01
160.0	5.47	-6.76	0.18	5.51	-7.14	-0.04

TABLE IX (J)

TIME SEC	EARTH-FIXED-ACCELERATION			SPACE-FIXED-ACCELERATION		
	DDXE M/SEC SQ	DDYE M/SEC SQ	DDZE M/SEC SC	DDXS M/SEC SQ	DDYS M/SEC SQ	DDZS M/SEC SQ
161.0	5.55	-6.76	0.18	5.59	-7.14	-0.05
162.0	5.72	-6.49	0.20	5.77	-6.87	-0.03
163.0	5.80	-6.52	0.19	5.84	-6.91	-0.04
164.0	5.79	-6.56	0.19	5.83	-6.94	-0.04
165.0	5.80	-6.45	0.17	5.84	-6.83	-0.06
166.0	5.81	-6.50	0.15	5.85	-6.88	-0.08
167.0	5.81	-6.56	0.16	5.85	-6.95	-0.06
168.0	5.81	-6.53	0.20	5.85	-6.91	-0.03
169.0	5.80	-6.33	0.19	5.84	-6.72	-0.03
170.0	5.80	-6.43	0.20	5.84	-6.82	-0.03
171.0	5.80	-6.51	0.32	5.83	-6.90	0.10
172.0	5.75	-6.29	0.51	5.79	-6.68	0.28
173.0	5.69	-6.11	0.64	5.73	-6.50	0.41
174.0	5.68	-6.19	0.76	5.72	-6.58	0.53
175.0	5.66	-6.10	0.85	5.70	-6.49	0.63
176.0	5.62	-5.96	0.92	5.66	-6.35	0.68
177.0	5.63	-5.97	0.89	5.66	-6.36	0.66
178.0	5.68	-6.11	0.86	5.72	-6.50	0.63
179.0	5.66	-6.09	0.86	5.69	-6.48	0.63
180.0	5.60	-5.95	0.81	5.73	-6.34	0.57
181.0	5.71	-5.95	0.80	5.75	-6.34	0.56
182.0	5.71	-6.06	0.77	5.74	-6.46	0.53
183.0	5.74	-5.98	0.75	5.77	-6.38	0.52
184.0	5.75	-6.05	0.70	5.78	-6.45	0.46
185.0	5.71	-6.13	0.60	5.74	-6.54	0.37
186.0	5.78	-6.02	0.67	5.80	-6.42	0.44
187.0	5.83	-5.99	0.72	5.86	-6.40	0.48
188.0	5.85	-6.11	0.55	5.88	-6.52	0.43
189.0	5.83	-6.14	0.63	5.95	-6.55	0.40
190.0	5.82	-6.04	0.67	5.85	-6.45	0.41
191.0	5.86	-6.07	0.65	5.88	-6.48	0.41
192.0	5.90	-6.23	0.58	5.92	-6.65	0.35
193.0	5.90	-6.09	0.58	5.92	-6.50	0.34
194.0	5.92	-6.03	0.58	5.94	-6.45	0.34
195.0	5.92	-6.13	0.62	5.93	-6.54	0.38
196.0	5.93	-6.08	0.58	5.95	-6.50	0.34
197.0	5.96	-6.07	0.50	5.97	-6.49	0.26
198.0	5.95	-6.10	0.53	5.96	-6.52	0.29
199.0	5.96	-6.04	0.56	5.97	-6.46	0.32
200.0	5.97	-6.08	0.53	5.98	-6.50	0.29

TABLE IX (J)

TIME SEC	EARTH-FIXED-ACCELERATION			SPACE-FIXED-ACCELERATION		
	DDXE M/SEC SQ	DDYE M/SEC SQ	DDZE M/SEC SQ	DDXS M/SEC SQ	DDYS M/SEC SQ	DDZS M/SEC SQ
201.0	5.94	-6.05	0.47	5.95	-6.47	0.23
202.0	5.96	-5.98	0.51	5.97	-6.41	0.27
203.0	6.00	-6.10	0.51	6.00	-6.52	0.27
204.0	5.98	-6.06	0.46	5.98	-6.48	0.21
205.0	6.01	-6.03	0.44	6.01	-6.46	0.20
206.0	6.04	-6.06	0.42	6.04	-6.49	0.18
207.0	6.02	-6.10	0.45	6.02	-6.53	0.21
208.0	6.01	-5.95	0.43	6.01	-6.38	0.18
209.0	6.07	-6.01	0.39	6.06	-6.44	0.14
210.0	6.04	-6.02	0.43	6.04	-6.46	0.19
211.0	6.05	-5.94	0.40	6.05	-6.37	0.15
212.0	6.08	-5.96	0.36	6.07	-6.40	0.12
213.0	6.07	-6.01	0.39	6.07	-6.44	0.15
214.0	6.08	-6.03	0.38	6.07	-6.47	0.13
215.0	6.12	-5.95	0.36	6.12	-6.39	0.12
216.0	6.15	-5.98	0.38	6.14	-6.42	0.13
217.0	6.16	-5.92	0.36	6.15	-6.37	0.11
218.0	6.14	-5.97	0.31	6.13	-6.41	0.06
219.0	6.17	-6.01	0.36	6.16	-6.45	0.11
220.0	6.21	-5.98	0.33	6.20	-6.43	0.08
221.0	6.24	-6.01	0.31	6.22	-6.46	0.06
222.0	6.20	-6.02	0.33	6.18	-6.47	0.08
223.0	6.21	-5.95	0.31	6.20	-6.40	0.06
224.0	6.25	-6.03	0.31	6.23	-6.48	0.07
225.0	6.25	-5.98	0.33	6.23	-6.43	0.07
226.0	6.27	-5.95	0.26	6.24	-6.41	0.01
227.0	6.31	-5.93	0.29	6.29	-6.39	0.03
228.0	6.32	-6.11	0.26	6.29	-6.57	0.01
229.0	6.30	-6.03	0.31	6.28	-6.49	0.06
230.0	6.35	-5.96	0.35	6.33	-6.43	0.10
231.0	6.36	-6.10	0.22	6.33	-6.56	-0.03
232.0	6.35	-5.98	0.24	6.33	-6.44	-0.02
233.0	6.37	-5.96	0.27	6.34	-6.43	0.02
234.0	6.37	-6.07	0.29	6.34	-6.53	0.03
235.0	6.39	-5.95	0.29	6.36	-6.42	0.04
236.0	6.39	-5.93	0.26	6.35	-6.40	0.01
237.0	6.40	-6.00	0.22	6.36	-6.47	-0.04
238.0	6.42	-5.98	0.26	6.39	-6.45	0.01
239.0	6.45	-6.00	0.28	6.42	-6.48	0.02
240.0	6.44	-5.95	0.22	6.40	-6.43	-0.04

TABLE IX (U)

TIME SEC	EARTH-FIXED-ACCELERATION			SPACE-FIXED-ACCELERATION		
	DDXE M/SEC SQ	DDYE M/SEC SQ	DDZE M/SEC SQ	DDXS M/SEC SQ	DDYS M/SEC SQ	DDZS M/SEC SQ
241.0	6.41	-5.93	0.25	6.37	-6.41	-0.01
242.0	6.45	-5.99	0.25	6.41	-6.46	-0.01
243.0	6.47	-5.89	0.24	5.43	-6.36	-0.02
244.0	6.49	-5.87	0.26	6.44	-6.35	0.00
245.0	6.49	-5.98	0.23	6.45	-6.46	-0.02
246.0	6.51	-5.97	0.21	6.47	-6.45	-0.05
247.0	6.50	-5.95	0.24	6.46	-6.44	-0.02
248.0	6.48	-5.92	0.23	6.44	-6.40	-0.03
249.0	6.51	-5.88	0.27	6.46	-6.37	0.01
250.0	6.55	-5.92	0.23	6.50	-6.41	-0.03
251.0	6.53	-5.87	0.22	6.48	-6.36	-0.04
252.0	6.54	-5.98	0.22	6.49	-6.47	-0.04
253.0	6.57	-5.90	0.23	6.52	-6.39	-0.03
254.0	6.57	-5.86	0.23	6.51	-6.35	-0.03
255.0	6.57	-5.97	0.22	6.51	-6.45	-0.04
256.0	6.57	-5.95	0.23	6.51	-6.45	-0.04
257.0	6.58	-5.95	0.22	6.52	-6.39	-0.04
258.0	6.62	-5.89	0.23	6.56	-6.34	-0.06
259.0	6.63	-5.84	0.21	6.57	-6.44	-0.06
260.0	6.61	-5.94	0.21	6.55	-6.42	-0.01
261.0	6.59	-5.91	0.26	6.53	-6.41	-0.06
262.0	6.64	-5.91	0.21	6.58	-6.30	-0.07
263.0	6.63	-5.79	0.20	6.57	-6.36	-0.03
264.0	6.57	-5.85	0.24	6.51	-6.45	-0.04
265.0	6.64	-5.95	0.23	6.57	-6.37	-0.06
266.0	6.66	-5.86	0.21	6.60	-6.46	-0.06
267.0	6.66	-5.94	0.21	6.59	-6.46	-0.06
268.0	6.67	-5.82	0.23	6.60	-6.33	-0.04
269.0	6.70	-5.79	0.23	6.63	-6.30	-0.04
270.0	6.69	-5.88	0.21	6.62	-6.39	-0.06
271.0	6.69	-5.79	0.25	6.62	-6.31	-0.03
272.0	6.74	-5.89	0.25	6.67	-6.40	-0.03
273.0	6.80	-5.82	0.22	6.72	-6.34	-0.05
274.0	6.73	-5.79	0.22	6.65	-6.31	-0.06
275.0	6.72	-5.96	0.23	6.65	-6.48	-0.05
276.0	6.77	-5.78	0.22	6.69	-6.31	-0.05
277.0	6.79	-5.76	0.26	6.72	-6.28	-0.02
278.0	6.83	-5.83	0.26	6.75	-6.36	-0.01
279.0	6.81	-5.78	0.20	6.73	-6.31	-0.07
280.0	6.79	-5.85	0.21	6.71	-6.38	-0.07

TABLE IX (U)

TIME SEC	EARTH-FIXED-ACCELERATION			SPACE-FIXED-ACCELERATION		
	DDXE M/SEC SQ	DDYE M/SEC SQ	DDZE M/SEC SQ	DDXS M/SEC SQ	DDYS M/SEC SQ	DDZS M/SEC SQ
281.0	6.81	-5.85	0.26	6.73	-6.38	-0.02
282.0	6.83	-5.86	0.25	6.75	-6.39	-0.03
283.0	6.82	-5.85	0.24	6.73	-6.38	-0.04
284.0	6.85	-5.72	0.25	6.76	-6.25	-0.02
285.0	6.83	-5.77	0.24	6.74	-6.31	-0.04
286.0	6.81	-5.83	0.24	6.72	-6.37	-0.04
287.0	6.84	-5.81	0.25	6.75	-6.35	-0.03
288.0	6.90	-5.78	0.22	6.81	-6.32	-0.06
289.0	6.89	-5.75	0.25	6.80	-6.29	-0.03
290.0	6.83	-5.79	0.24	6.74	-6.34	-0.04
291.0	6.88	-5.76	0.24	6.79	-6.31	-0.04
292.0	6.94	-5.78	0.27	6.85	-6.33	-0.01
293.0	6.95	-5.74	0.25	6.86	-6.29	-0.03
294.0	6.93	-5.78	0.24	6.84	-6.33	-0.05
295.0	6.93	-5.77	0.26	6.83	-6.32	-0.02
296.0	6.92	-5.80	0.26	6.82	-6.35	-0.02
297.0	6.91	-5.69	0.24	6.81	-6.24	-0.04
298.0	6.96	-5.71	0.25	6.86	-6.27	-0.03
299.0	6.98	-5.78	0.24	6.87	-6.34	-0.04
300.0	6.95	-5.78	0.28	6.84	-6.33	-0.03
301.0	7.03	-5.74	0.25	6.92	-6.30	-0.03
302.0	7.05	-5.77	0.25	6.94	-6.33	-0.04
303.0	7.04	-5.73	0.25	6.94	-6.29	-0.04
304.0	7.09	-5.74	0.27	6.99	-6.30	-0.01
305.0	7.08	-5.81	0.26	6.97	-6.38	-0.03
306.0	7.08	-5.75	0.25	6.97	-6.32	-0.04
307.0	7.14	-5.80	0.29	7.03	-6.36	0.00
308.0	7.16	-5.80	0.26	7.05	-6.38	-0.03
309.0	7.17	-5.66	0.27	7.06	-6.23	-0.02
310.0	7.19	-5.81	0.27	7.07	-6.38	-0.02
311.0	7.20	-5.91	0.28	7.09	-6.48	-0.01
312.0	7.21	-5.81	0.29	7.10	-6.38	0.00
313.0	7.24	-5.81	0.28	7.12	-6.39	-0.01
314.0	7.27	-5.87	0.26	7.15	-6.45	-0.03
315.0	7.26	-5.81	0.29	7.14	-6.39	-0.00
316.0	7.26	-5.79	0.29	7.14	-6.37	-0.01
317.0	7.29	-5.90	0.28	7.17	-6.48	-0.02
318.0	7.33	-5.81	0.30	7.21	-6.40	-0.00
319.0	7.33	-5.77	0.29	7.21	-6.36	-0.01
320.0	7.32	-5.87	0.29	7.19	-6.46	-0.00

TABLE IX (U)

TIME SEC	EARTH-FIXED-ACCELERATION			SPACE-FIXED-ACCELERATION		
	DDXE M/SEC SQ	DDYE M/SEC SQ	DDZE M/SEC SQ	DDXS M/SEC SQ	DDYS M/SEC SQ	DDZS M/SEC SQ
321.0	7.34	-5.85	0.30	7.21	-6.44	-0.00
322.0	7.38	-5.78	0.30	7.25	-6.38	0.00
323.0	7.42	-5.80	0.29	7.30	-6.40	-0.02
324.0	7.39	-5.86	0.29	7.26	-6.46	-0.02
325.0	7.38	-5.91	0.32	7.25	-6.51	0.02
326.0	7.46	-5.86	0.28	7.32	-6.46	-0.02
327.0	7.50	-5.79	0.29	7.37	-6.40	-0.02
328.0	7.50	-5.83	0.31	7.36	-6.43	0.01
329.0	7.46	-5.91	0.31	7.33	-6.52	0.01
330.0	7.47	-5.93	0.29	7.33	-6.54	-0.01
331.0	7.56	-5.81	0.30	7.42	-6.42	-0.01
332.0	7.61	-5.84	0.36	7.47	-6.45	0.05
333.0	7.60	-5.93	0.28	7.45	-6.54	-0.02
334.0	7.55	-6.03	0.29	7.40	-6.64	-0.01
335.0	7.59	-5.90	0.33	7.44	-6.52	0.02
336.0	7.59	-5.86	0.28	7.45	-6.48	-0.02
337.0	7.65	-5.80	0.32	7.51	-6.42	0.01
338.0	7.72	-5.87	0.31	7.58	-6.50	0.00
339.0	7.66	-5.98	0.31	7.51	-6.60	-0.00
340.0	7.64	-5.93	0.36	7.49	-6.56	0.05
341.0	7.71	-5.96	0.30	7.55	-6.58	-0.01
342.0	7.78	-5.79	0.30	7.62	-6.42	-0.01
343.0	7.77	-5.91	0.36	7.62	-6.54	0.05
344.0	7.75	-6.01	0.30	7.60	-6.64	-0.01
345.0	7.77	-5.85	0.32	7.61	-6.49	0.01
346.0	7.81	-5.91	0.37	7.65	-6.54	0.05
347.0	7.82	-6.01	0.34	7.66	-6.65	0.02
348.0	7.87	-5.87	0.34	7.71	-6.51	0.02
349.0	7.85	-5.91	0.32	7.69	-6.55	0.00
350.0	7.82	-5.92	0.33	7.65	-6.57	0.01
351.0	7.90	-5.94	0.38	7.74	-6.58	0.06
352.0	7.95	-5.98	0.30	7.78	-6.62	-0.02
353.0	7.94	-5.96	0.31	7.77	-6.61	-0.01
354.0	7.91	-6.05	0.36	7.74	-6.70	0.04
355.0	7.96	-5.92	0.37	7.80	-6.57	0.05
356.0	8.01	-5.96	0.36	7.84	-6.62	0.04
357.0	8.03	-6.00	0.31	7.85	-6.65	-0.01
358.0	8.03	-5.96	0.33	7.86	-6.61	0.00
359.0	8.05	-6.02	0.35	7.88	-6.68	0.02
360.0	8.05	-6.00	0.39	7.88	-6.66	0.07

TABLE IX (J)

TIME SEC	EARTH-FIXED-ACCELERATION			SPACE-FIXED-ACCELERATION		
	DDXE M/SEC SQ	DDYE M/SEC SQ	DDZE M/SEC SQ	DDXS M/SEC SQ	DDYS M/SEC SQ	DDZS M/SEC SQ
361.0	8.07	-6.00	0.37	7.89	-6.66	0.04
362.0	8.09	-6.05	0.34	7.91	-6.71	0.01
363.0	8.11	-5.92	0.32	7.93	-6.58	-0.01
364.0	8.19	-6.00	0.36	8.01	-6.67	0.03
365.0	8.15	-6.10	0.37	7.96	-6.77	0.04
366.0	8.12	-5.94	0.37	7.94	-6.61	0.04
367.0	8.20	-6.03	0.40	8.01	-6.71	0.07
368.0	8.26	-6.02	0.35	8.07	-6.70	0.01
369.0	8.28	-5.93	0.31	8.09	-6.61	-0.03
370.0	8.25	-6.08	0.36	8.06	-6.76	0.03
371.0	8.20	-6.08	0.41	8.01	-6.76	0.07
372.0	8.28	-6.01	0.39	8.09	-6.69	0.05
373.0	8.36	-5.99	0.38	8.17	-6.67	0.05
374.0	8.34	-6.11	0.32	8.15	-6.80	-0.02
375.0	8.35	-6.03	0.33	8.16	-6.72	-0.00
376.0	8.37	-6.01	0.41	8.18	-6.70	0.07
377.0	8.35	-6.09	0.37	8.15	-6.79	0.03
378.0	8.42	-6.12	0.39	8.22	-6.82	0.05
379.0	8.48	-6.06	0.41	8.29	-6.76	0.07
380.0	8.46	-6.01	0.37	8.26	-6.71	0.03
381.0	8.43	-6.14	0.40	8.23	-6.84	0.06
382.0	8.45	-6.12	0.34	8.24	-6.83	0.00
383.0	8.50	-6.16	0.33	8.29	-6.87	-0.01
384.0	8.55	-6.12	0.41	8.35	-6.83	0.07
385.0	8.59	-6.00	0.39	8.39	-6.71	0.04
386.0	8.56	-6.15	0.37	8.35	-6.86	0.02
387.0	8.53	-6.22	0.39	8.32	-6.93	0.05
388.0	8.63	-6.18	0.42	8.42	-6.90	0.07
389.0	8.69	-6.17	0.40	8.48	-6.89	0.06
390.0	8.68	-6.11	0.39	8.46	-6.83	0.04
391.0	8.68	-6.18	0.38	8.46	-6.91	0.03
392.0	8.69	-6.16	0.41	8.47	-6.88	0.06
393.0	8.74	-6.17	0.42	8.52	-6.90	0.07
394.0	8.80	-6.12	0.37	8.58	-6.85	0.02
395.0	8.80	-6.16	0.34	8.58	-6.89	-0.01
396.0	8.78	-6.24	0.38	8.56	-6.97	0.03
397.0	8.79	-6.21	0.39	8.57	-6.95	0.04
398.0	8.85	-6.22	0.41	8.63	-6.96	0.06
399.0	8.93	-6.25	0.42	8.70	-6.99	0.07
400.0	8.94	-6.26	0.40	8.71	-7.00	0.04

TABLE IX (U)

TIME SEC	EARTH-FIXED-ACCELERATION			SPACE-FIXED-ACCELERATION		
	DDXE M/SEC SQ	DDYE M/SEC SQ	DDZE M/SEC SQ	DDXS M/SEC SQ	DDYS M/SEC SQ	DDZS M/SEC SQ
401.0	8.93	-6.21	0.39	8.70	-6.95	0.03
402.0	8.94	-6.25	0.41	8.71	-6.99	0.05
403.0	8.97	-6.36	0.42	8.73	-7.11	0.06
404.0	9.02	-6.33	0.42	8.78	-7.08	0.06
405.0	9.08	-6.28	0.42	8.85	-7.03	0.06
406.0	9.08	-6.35	0.40	8.84	-7.10	0.03
407.0	9.07	-6.36	0.42	8.83	-7.11	0.05
408.0	9.12	-6.30	0.37	8.88	-7.07	0.01
409.0	9.14	-6.36	0.35	8.90	-7.13	-0.01
410.0	9.19	-6.33	0.43	8.95	-7.09	0.07
411.0	9.22	-6.38	0.43	9.00	-7.18	0.07
412.0	9.25	-6.41	0.43	9.05	-7.14	0.05
413.0	9.29	-6.36	0.41	9.00	-7.23	0.03
414.0	9.25	-6.45	0.40	9.06	-7.21	0.07
415.0	9.31	-6.44	0.44	9.13	-7.23	0.06
416.0	9.38	-6.45	0.43	9.13	-7.26	0.04
417.0	9.38	-6.48	0.41	9.20	-7.20	0.05
418.0	9.45	-6.41	0.42	9.16	-7.38	0.07
419.0	9.42	-6.60	0.44	9.15	-7.31	0.06
420.0	9.41	-6.52	0.43	9.27	-7.21	0.05
421.0	9.53	-6.42	0.42	9.31	-7.32	0.04
422.0	9.57	-6.52	0.42	9.29	-7.35	0.08
423.0	9.55	-6.56	0.45	9.30	-7.33	0.06
424.0	9.56	-6.53	0.44	9.32	-7.29	0.03
425.0	9.58	-6.49	0.41	9.39	-7.41	0.07
426.0	9.66	-6.60	0.45	9.44	-7.43	0.07
427.0	9.71	-6.62	0.45	9.43	-7.36	0.05
428.0	9.70	-6.55	0.43	9.42	-7.47	0.01
429.0	9.70	-6.66	0.39	9.45	-7.32	-0.01
430.0	9.72	-6.51	0.38	9.51	-7.43	0.05
431.0	9.79	-6.62	0.44	9.53	-7.56	0.06
432.0	9.81	-6.75	0.46	9.56	-7.48	0.07
433.0	9.85	-6.66	0.45	9.59	-7.53	0.05
434.0	9.87	-6.70	0.44	9.57	-7.59	0.03
435.0	9.88	-6.76	0.42	9.59	-7.62	0.06
436.0	9.88	-6.79	0.45	9.63	-7.53	0.08
437.0	9.92	-6.70	0.47	9.70	-7.52	0.06
438.0	9.98	-6.69	0.45	9.68	-7.54	0.06
439.0	9.97	-6.71	0.45	9.70	-7.65	0.06
440.0	9.99	-6.82	0.45			

TABLE IX (U)

TIME SEC	EARTH-FIXED-ACCELERATION			SPACE-FIXED-ACCELERATION		
	DDXE M/SEC SQ	DDYE M/SEC SQ	DDZE M/SEC SQ	DDXS M/SEC SQ	DDYS M/SEC SQ	DDZS M/SEC SQ
441.0	10.03	-6.78	0.43	9.73	-7.62	0.03
442.0	10.10	-6.77	0.47	9.81	-7.61	0.08
443.0	10.14	-6.88	0.47	9.84	-7.72	0.07
444.0	10.15	-6.75	0.43	9.86	-7.60	0.03
445.0	10.17	-6.79	0.47	9.87	-7.64	0.07
446.0	10.21	-6.80	0.45	9.90	-7.66	0.05
447.0	10.21	-6.72	0.46	9.91	-7.57	0.06
448.0	10.25	-6.83	0.49	9.94	-7.69	0.09
449.0	10.29	-6.91	0.45	9.99	-7.77	0.05
450.0	10.28	-6.77	0.44	9.97	-7.63	0.04
451.0	10.33	-6.77	0.48	10.02	-7.64	0.07
452.0	10.38	-6.91	0.44	10.07	-7.78	0.04
453.0	10.38	-6.91	0.40	10.06	-7.78	-0.00
454.0	10.39	-6.84	0.44	10.08	-7.71	0.03
455.0	10.44	-6.81	0.49	10.13	-7.69	0.08
456.0	10.49	-6.85	0.47	10.18	-7.73	0.06
457.0	10.53	-6.94	0.46	10.21	-7.82	0.05
458.0	10.54	-6.88	0.47	10.21	-7.76	0.08
459.0	10.59	-6.93	0.50	10.26	-7.82	0.04
460.0	10.59	-6.93	0.45	10.26	-7.82	0.04
461.0	10.59	-6.94	0.51	10.27	-7.83	0.09
462.0	10.68	-6.87	0.46	10.35	-7.77	0.05
463.0	10.71	-6.94	0.48	10.38	-7.84	0.06
464.0	10.74	-6.99	0.56	10.41	-7.90	0.14
465.0	10.70	-7.03	0.51	10.37	-7.93	0.09
466.0	10.75	-7.05	0.48	10.41	-7.96	0.06
467.0	10.85	-7.00	0.49	10.52	-7.91	0.07
468.0	10.85	-6.97	0.49	10.51	-7.88	0.07
469.0	10.87	-6.98	0.49	10.53	-7.90	0.06
470.0	10.96	-7.11	0.49	10.62	-8.03	0.06
471.0	11.00	-7.11	0.50	10.65	-8.05	0.07
472.0	10.96	-7.04	0.49	10.61	-7.97	0.06
473.0	11.04	-7.08	0.50	10.70	-8.01	0.07
474.0	11.13	-7.15	0.48	10.78	-8.08	0.05
475.0	11.10	-7.19	0.43	10.75	-8.12	0.00
476.0	11.13	-7.17	0.46	10.78	-8.10	0.02
477.0	11.18	-7.18	0.51	10.82	-8.12	0.07
478.0	11.19	-7.25	0.50	10.83	-8.19	0.06
479.0	11.20	-7.22	0.51	10.84	-8.17	0.08
480.0	11.24	-7.23	0.50	10.87	-8.18	0.06

TABLE IX (U)

TIME SEC	EARTH-FIXED-ACCELERATION			SPACE-FIXED-ACCELERATION		
	DDXE M/SEC SQ	DDYE M/SEC SQ	DDZE M/SEC SQ	DDXS M/SEC SQ	DDYS M/SEC SQ	DDZS M/SEC SQ
481.0	11.33	-7.26	0.50	10.97	-8.22	0.06
482.0	11.38	-7.25	0.51	11.02	-8.21	0.07
483.0	11.45	-7.32	0.50	11.08	-8.28	0.06
484.0	11.47	-7.38	0.53	11.10	-8.35	0.08
485.0	11.48	-7.31	0.51	11.11	-8.28	0.07
486.0	11.54	-7.38	0.52	11.16	-8.35	0.07
487.0	11.57	-7.45	0.52	11.20	-8.42	0.07
488.0	11.63	-7.31	0.52	11.25	-8.29	0.07
489.0	11.65	-7.47	0.53	11.27	-8.45	0.08
490.0	11.65	-7.49	0.52	11.27	-8.48	0.07
491.0	11.73	-7.47	0.52	11.35	-8.45	0.07
492.0	11.79	-7.45	0.54	11.40	-8.44	0.09
493.0	11.78	-7.61	0.53	11.39	-8.61	0.08
494.0	11.80	-7.57	0.51	11.41	-8.57	0.06
495.0	11.87	-7.42	0.53	11.48	-8.42	0.08
496.0	11.88	-7.66	0.52	11.48	-8.66	0.06
497.0	11.94	-7.58	0.53	11.54	-8.58	0.08
498.0	11.96	-7.57	0.54	11.57	-8.58	0.08
499.0	11.97	-7.63	0.52	11.57	-8.64	0.06
500.0	12.05	-7.64	0.54	11.65	-8.65	0.08
501.0	12.10	-7.68	0.53	11.69	-8.70	0.06
502.0	12.13	-7.67	0.51	11.72	-8.69	0.04
503.0	12.19	-7.57	0.56	11.78	-8.60	0.09
504.0	12.22	-7.64	0.55	11.81	-8.67	0.08
505.0	12.29	-7.85	0.54	11.87	-8.88	0.07
506.0	12.30	-7.73	0.54	11.89	-8.76	0.07
507.0	12.26	-7.68	0.54	11.85	-8.72	0.06
508.0	12.37	-7.84	0.54	11.95	-8.88	0.07
509.0	12.45	-7.78	0.54	12.03	-8.83	0.06
510.0	12.48	-7.79	0.55	12.06	-8.84	0.07
511.0	12.53	-7.88	0.56	12.10	-8.94	0.08
512.0	12.57	-7.85	0.55	12.14	-8.91	0.07
513.0	12.60	-7.88	0.54	12.17	-8.94	0.06
514.0	12.64	-7.87	0.55	12.21	-8.93	0.08
515.0	12.61	-7.94	0.63	12.18	-9.00	0.14
516.0	12.70	-7.91	0.59	12.27	-8.99	0.10
517.0	12.82	-8.06	0.56	12.38	-9.14	0.07
518.0	12.87	-8.09	0.55	12.43	-9.17	0.07
519.0	12.91	-7.99	0.56	12.47	-9.08	0.07
520.0	12.96	-7.98	0.59	12.52	-9.07	0.10

TABLE IX (U)

TIME SEC	EARTH-FIXED-ACCELERATION			SPACE-FIXED-ACCELERATION		
	DDXE M/SEC SQ	DDYE M/SEC SQ	DDZE M/SEC SQ	DDXS M/SEC SQ	DDYS M/SEC SQ	DDZS M/SEC SQ
521.0	13.01	-8.13	0.56	12.56	-9.22	0.06
522.0	13.04	-8.20	0.56	12.58	-9.30	0.07
523.0	13.07	-8.16	0.59	12.61	-9.25	0.09
524.0	13.10	-8.25	0.57	12.64	-9.35	0.07
525.0	13.12	-8.17	0.56	12.66	-9.27	0.06
526.0	13.23	-8.18	0.57	12.77	-9.29	0.07
527.0	13.31	-8.27	0.59	12.84	-9.39	0.09
528.0	13.31	-8.26	0.59	12.85	-9.38	0.09
529.0	13.33	-8.23	0.64	12.86	-9.35	0.13
530.0	13.43	-8.21	0.61	12.96	-9.34	0.10
531.0	13.48	-8.29	0.59	13.01	-9.42	0.08
532.0	13.47	-8.30	0.57	12.99	-9.44	0.06
533.0	13.48	-8.32	0.58	13.00	-9.46	0.07
534.0	13.57	-8.42	0.54	13.09	-9.56	0.02
535.0	13.63	-8.46	0.54	13.14	-9.61	0.03
536.0	13.67	-8.40	0.59	13.18	-9.55	0.07
537.0	13.74	-8.46	0.60	13.25	-9.62	0.08
538.0	13.82	-8.53	0.61	13.33	-9.69	0.09
539.0	13.85	-8.43	0.60	13.36	-9.59	0.08
540.0	13.91	-8.54	0.56	13.41	-9.71	0.04
541.0	13.95	-8.67	0.62	13.45	-9.84	0.09
542.0	13.95	-8.56	0.63	13.45	-9.73	0.11
543.0	14.02	-8.58	0.57	13.51	-9.76	0.04
544.0	14.12	-8.63	0.62	13.61	-9.81	0.09
545.0	14.14	-8.64	0.66	13.63	-9.83	0.13
546.0	14.17	-8.66	0.65	13.66	-9.85	0.11
547.0	14.20	-8.72	0.61	13.68	-9.91	0.08
548.0	14.30	-8.83	0.63	13.78	-10.03	0.09
549.0	14.37	-8.74	0.57	13.85	-9.94	0.03
550.0	14.39	-8.77	0.55	13.87	-9.98	0.01
551.0	14.50	-8.87	0.60	13.98	-10.09	0.05
552.0	14.55	-8.85	0.64	14.02	-10.06	0.10
553.0	14.55	-8.85	0.61	14.02	-10.07	0.07
554.0	14.57	-8.84	0.64	14.04	-10.06	0.10
555.0	14.68	-8.96	0.63	14.14	-10.19	0.08
556.0	14.80	-8.93	0.62	14.27	-10.16	0.06
557.0	14.84	-9.03	0.64	14.29	-10.27	0.08
558.0	14.90	-9.06	0.65	14.35	-10.30	0.10
559.0	15.04	-9.02	0.63	14.49	-10.27	0.07
560.0	15.03	-9.15	0.64	14.47	-10.41	0.08

TABLE IX (U)

TIME SEC	EARTH-FIXED-ACCELERATION			SPACE-FIXED-ACCELERATION		
	DDXE M/SEC SQ	DDYE M/SEC SQ	DDZE M/SEC SQ	DDXS M/SEC SQ	DDYS M/SEC SQ	DDZS M/SEC SQ
561.0	15.08	-9.17	0.63	14.52	-10.43	0.07
562.0	15.18	-9.18	0.55	14.62	-10.45	0.10
563.0	15.21	-9.27	0.66	14.65	-10.55	0.09
564.0	15.28	-9.36	0.62	14.71	-10.63	0.06
565.0	15.35	-9.32	0.66	14.78	-10.60	0.09
566.0	15.42	-9.35	0.65	14.85	-10.64	0.09
567.0	15.51	-9.40	0.65	14.93	-10.69	0.08
568.0	15.59	-9.40	0.66	15.01	-10.70	0.09
569.0	15.66	-9.50	0.66	15.07	-10.80	0.08
570.0	15.70	-9.53	0.65	15.12	-10.84	0.13
571.0	15.72	-9.53	0.71	15.13	-10.84	0.14
572.0	15.73	-9.66	0.72	15.14	-10.98	0.08
573.0	15.83	-9.69	0.66	15.23	-11.01	0.10
574.0	15.98	-9.73	0.69	15.38	-11.06	0.05
575.0	16.02	-9.80	0.64	15.41	-11.13	0.01
576.0	16.04	-9.79	0.60	15.44	-11.12	0.09
577.0	16.15	-9.83	0.69	15.54	-11.18	0.07
578.0	16.25	-9.87	0.66	15.63	-11.22	0.07
579.0	16.29	-9.94	0.67	15.67	-11.29	0.10
580.0	16.39	-9.91	0.70	15.77	-11.27	0.07
581.0	16.45	-9.95	0.67	15.83	-11.31	0.07
582.0	16.52	-10.01	0.57	15.89	-11.39	0.09
583.0	16.58	-10.09	0.70	15.95	-11.46	0.10
584.0	16.67	-10.09	0.71	16.04	-11.47	0.06
585.0	16.75	-10.12	0.68	16.11	-11.51	0.07
586.0	16.86	-10.12	0.69	16.22	-11.58	0.11
587.0	16.87	-10.18	0.72	16.23	-11.72	0.06
588.0	16.95	-10.32	0.68	15.30	-11.72	0.09
589.0	17.05	-10.28	0.71	16.40	-11.69	0.08
590.0	17.13	-10.32	0.71	16.48	-11.73	0.07
591.0	17.14	-10.35	0.70	16.48	-11.77	0.10
592.0	17.24	-10.41	0.73	16.74	-11.82	0.07
593.0	17.40	-10.39	0.70	16.74	-11.86	0.08
594.0	17.38	-10.42	0.71	16.71	-12.05	0.08
595.0	17.39	-10.61	0.71	16.72	-12.00	0.09
596.0	17.54	-10.55	0.72	15.86	-12.06	0.10
597.0	17.66	-10.61	0.74	16.98	-12.16	0.09
598.0	17.77	-10.69	0.73	17.09	-12.21	0.06
599.0	17.75	-10.74	0.70	17.06	-12.24	0.09
600.0	17.87	-10.77	0.73	17.18		

TABLE IX (U)

TIME SEC	EARTH-FIXED-ACCELERATION			SPACE-FIXED-ACCELERATION		
	DDXE M/SEC SQ	DDYE M/SEC SQ	DDZE M/SEC SQ	DDXS M/SEC SQ	DDYS M/SEC SQ	DDZS M/SEC SQ
601.0	18.07	-10.83	0.76	17.38	-12.32	0.11
602.0	18.09	-10.86	0.73	17.39	-12.35	0.06
603.0	18.14	-10.82	0.74	17.44	-12.31	0.08
604.0	18.23	-10.95	0.75	17.52	-12.45	0.09
605.0	18.25	-11.05	0.75	17.53	-12.56	0.10
606.0	18.41	-11.13	0.74	17.69	-12.64	0.08
607.0	18.53	-11.13	0.74	17.81	-12.65	0.08
608.0	18.57	-11.07	0.77	17.85	-12.60	0.10
609.0	18.72	-11.23	0.72	17.99	-12.76	0.05
610.0	18.84	-11.42	0.71	18.10	-12.96	0.03
611.0	18.82	-11.31	0.75	18.08	-12.85	0.08
612.0	18.92	-11.35	0.76	18.18	-12.90	0.08
613.0	19.11	-11.52	0.78	18.36	-13.08	0.10
614.0	19.21	-11.44	0.76	18.46	-13.01	0.08
615.0	19.27	-11.50	0.79	18.52	-13.08	0.10
616.0	19.36	-11.68	0.80	18.59	-13.26	0.11
617.0	19.52	-11.68	0.77	18.75	-13.27	0.08
618.0	19.54	-11.74	0.78	18.77	-13.34	0.09
619.0	19.34	-11.82	0.74	18.57	-13.41	0.05
620.0	19.64	-11.87	0.74	18.86	-13.48	0.04
621.0	19.89	-11.98	0.76	19.10	-13.60	0.06
622.0	19.91	-11.98	0.79	19.12	-13.61	0.09
623.0	19.95	-12.28	0.79	19.15	-13.91	0.09
624.0	20.13	-12.06	0.80	19.34	-13.70	0.09

## S-IV CUTOFF SIGNAL

624.860	20.14	-12.26	0.80	19.33	-13.90	0.09
625.0	19.12	-11.89	0.78	18.33	-13.50	0.09
626.0	-2.45	-8.10	0.34	-3.08	-8.88	0.07
627.0	-3.20	-7.84	0.31	-3.83	-8.59	0.06
628.0	-2.66	-7.94	0.33	-3.30	-8.70	0.07
629.0	-2.73	-7.93	0.33	-3.37	-8.70	0.07
630.0	-2.66	-7.89	0.35	-3.29	-8.66	0.09
631.0	-2.65	-7.89	0.32	-3.29	-8.66	0.06
632.0	-2.71	-7.91	0.32	-3.35	-8.67	0.06
633.0	-2.74	-7.89	0.34	-3.38	-8.65	0.08
634.0	-2.76	-7.89	0.34	-3.40	-8.65	0.09

## INSERTION

634.860	-2.70	-7.85	0.37	-3.34	-8.61	0.12
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TABLE X (U)

TIME SEC	ALTITUDE M	RANGE M	E.C.DIST. M	LATITUDE DEG	LONGITUDE DEG
FIRST MOTION					
0.170	32	0	373350	28.53185	-80.56495
LIFTOFF SIGNAL					
0.400	32	0	6373350	28.53185	-80.56495
1.0	33	0	6373351	28.53185	-80.56495
2.0	37	0	6373356	28.53185	-80.56495
3.0	45	0	6373363	28.53185	-80.56495
4.0	55	0	6373373	28.53185	-80.56495
5.0	69	0	6373387	28.53185	-80.56495
6.0	87	-0	6373405	28.53186	-80.56496
7.0	108	-0	6373426	28.53186	-80.56496
8.0	133	-0	6373451	28.53186	-80.56496
9.0	161	-1	6373479	28.53187	-80.56496
10.0	194	-1	6373512	28.53187	-80.56496
11.0	230	-2	6373549	28.53187	-80.56496
12.0	271	-2	6373589	28.53188	-80.56496
13.0	316	-3	6373634	28.53189	-80.56497
14.0	365	-4	6373683	28.53189	-80.56497
15.0	418	-5	6373736	28.53190	-80.56497
16.0	476	-6	6373794	28.53191	-80.56497
17.0	539	-7	6373857	28.53191	-80.56498
18.0	606	-7	6373924	28.53192	-80.56498
19.0	678	-8	6373996	28.53193	-80.56497
20.0	754	-9	6374072	28.53194	-80.56497
21.0	836	11	6374154	28.53195	-80.56495
22.0	923	11	6374241	28.53195	-80.56493
23.0	1014	13	6374332	28.53195	-80.56483
24.0	1111	16	6374429	28.53195	-80.56476
25.0	1212	22	6374530	28.53195	-80.56467
26.0	1319	29	6374637	28.53194	-80.56456
27.0	1430	40	6374749	28.53193	-80.56442
28.0	1547	52	6374866	28.53191	-80.56426
29.0	1670	68	6374988	28.53188	-80.56407
30.0	1797	86	6375116	28.53185	

TABLE X (U)

TIME SEC	ALTITUDE M	RANGE M	E.C.DIST. M	LATITUDE DEG	LONGITUDE DEG
31.0	1931	108	6375249	28.53181	-80.56385
32.0	2069	133	6375387	28.53176	-80.56360
33.0	2213	161	6375531	28.53170	-80.56332
34.0	2363	194	6375681	28.53163	-80.56299
35.0	2518	231	6375836	28.53155	-80.56262
36.0	2679	272	6375997	28.53146	-80.56221
37.0	2845	319	6376163	28.53136	-80.56174
38.0	3017	372	6376335	28.53125	-80.56122
39.0	3194	430	6376513	28.53112	-80.56064
40.0	3377	494	6376696	28.53098	-80.56000
41.0	3566	564	6376885	28.53082	-80.55931
42.0	3761	640	6377079	28.53065	-80.55855
43.0	3961	722	6377279	28.53047	-80.55774
44.0	4167	811	6377486	28.53027	-80.55686
45.0	4379	906	6377698	28.53006	-80.55592
46.0	4597	1007	6377916	28.52983	-80.55492
47.0	4822	1114	6378141	28.52959	-80.55380
48.0	5053	1228	6378372	28.52933	-80.55274
49.0	5290	1348	6378609	28.52905	-80.55155
50.0	5533	1475	6378852	28.52876	-80.55029
51.0	5783	1609	6379102	28.52846	-80.54897
52.0	6039	1750	6379359	28.52814	-80.54758
53.0	6302	1898	6379622	28.52780	-80.54611
54.0	6572	2052	6379891	28.52745	-80.54458
MACH ONE					
54.705	6765	2166	6380025	28.52719	-80.54346
55.0	6847	2214	6380167	28.52708	-80.54298
56.0	7129	2384	6380448	28.52670	-80.54131
57.0	7416	2560	6380736	28.52630	-80.53956
58.0	7709	2744	6381029	28.52589	-80.53774
59.0	8008	2936	6381329	28.52546	-80.53585
60.0	8313	3135	6381634	28.52502	-80.53388
61.0	8625	3341	6381945	28.52456	-80.53183
62.0	8942	3555	6382263	28.52409	-80.52971
63.0	9266	3777	6382587	28.52360	-80.52751
64.0	9596	4007	6382917	28.52310	-80.52523
65.0	9933	4246	6383254	28.52258	-80.52286

TABLE X (U)

TIME SEC	ALTITUDE M	RANGE M	E.C.DIST. M	LATITUDE DEG	LONGITUDE DEG
66.0	10277	4492	6383598	28.52205	-80.52042
67.0	10628	4746	6383949	28.52149	-80.51790
68.0	10986	5009	6384308	28.52092	-80.51530
69.0	11353	5279	6384674	28.52033	-80.51262
70.0	11727	5558	6385049	28.51973	-80.50985
71.0	12109	5845	6385431	28.51910	-80.50700
72.0	12500	6142	6385822	28.51845	-80.50407
MAXIMUM DYNAMIC PRESSURE					
72.500	12698	6293	6386021	28.51811	-80.50257
73.0	12899	6447	6386221	28.51778	-80.50104
74.0	13307	6763	6386529	28.51708	-80.49791
75.0	13723	7089	6387046	28.51636	-80.49469
76.0	14149	7426	6387472	28.51561	-80.49135
77.0	14582	7775	6387906	28.51483	-80.48790
78.0	15024	8136	6388348	28.51403	-80.48432
79.0	15475	8510	6388799	28.51319	-80.48062
80.0	15934	8897	6389258	28.51232	-80.47679
81.0	16403	9297	6389727	28.51141	-80.47284
82.0	16880	9711	6390205	28.51047	-80.46874
83.0	17367	10139	6390692	28.50950	-80.46451
84.0	17863	10582	6391188	28.50849	-80.46013
85.0	18368	11040	6391694	28.50744	-80.45561
86.0	18883	11513	6392209	28.50636	-80.45093
87.0	19407	12003	6392734	28.50523	-80.44609
88.0	19941	12509	6393268	28.50408	-80.44109
89.0	20485	13032	6393812	28.50287	-80.43593
90.0	21039	13572	6394366	28.50163	-80.43059
91.0	21602	14131	6394930	28.50035	-80.42507
92.0	22176	14708	6395504	28.49902	-80.41937
93.0	22759	15305	6396087	28.49765	-80.41348
94.0	23351	15921	6396680	28.49623	-80.40739
95.0	23954	16558	6397283	28.49476	-80.40110
96.0	24566	17215	6397896	28.49324	-80.39461
97.0	25188	17894	6398518	28.49166	-80.38791
98.0	25820	18595	6399151	28.49004	-80.38100
99.0	26461	19317	6399793	28.48836	-80.37387
100.0	27113	20063	6400445	28.48663	-80.36651

TABLE X (U)

TIME SEC	ALTITUDE M	RANGE M	E.C.DIST. M	LATITUDE DEG	LONGITUDE DEG
101.0	27774	20832	6401107	28.48484	-80.35892
102.0	28445	21625	6401779	28.48300	-80.35110
103.0	29127	22442	6402460	28.48109	-80.34303
104.0	29818	23284	6403152	28.47913	-80.33473
105.0	30519	24152	6403854	28.47710	-80.32617
106.0	31230	25045	6404566	28.47501	-80.31736
107.0	31951	25964	6405288	28.47285	-80.30830
108.0	32683	26910	6406020	28.47064	-80.29897
109.0	33425	27883	6406763	28.46835	-80.28938
110.0	34177	28884	6407515	28.46601	-80.27951
111.0	34939	29913	6408279	28.46359	-80.26936
112.0	35712	30971	6409052	28.46110	-80.25893
113.0	36495	32058	6409836	28.45854	-80.24822
114.0	37289	33175	6410631	28.45591	-80.23721
115.0	38093	34323	6411436	28.45320	-80.22590
116.0	38908	35501	6412252	28.45041	-80.21428
117.0	39733	36711	6413077	28.44756	-80.20236

## ENGINE EIGHT PREMATURE SHUTDOWN

117.280	39966	37056	6413311	28.44674	-80.19896
118.0	40567	37951	6413912	28.44462	-80.19014
119.0	41410	39221	6414757	28.44161	-80.17764
120.0	42262	40520	6415609	28.43853	-80.16484
121.0	43121	41848	6416469	28.43538	-80.15176
122.0	43988	43206	6417337	28.43215	-80.13839
123.0	44863	44594	6418213	28.42884	-80.12473
124.0	45746	46013	6419097	28.42546	-80.11076
125.0	46637	47462	6419989	28.42200	-80.09649
126.0	47536	48944	6420890	28.41846	-80.08191
127.0	48443	50458	6421798	28.41484	-80.06701
128.0	49358	52005	6422713	28.41113	-80.05179
129.0	50280	53585	6423637	28.40734	-80.03624
130.0	51211	55199	6424569	28.40347	-80.02036
131.0	52149	56848	6425508	28.39951	-80.00414
132.0	53095	58532	6426455	28.39546	-79.98758
133.0	54048	60252	6427410	28.39132	-79.97067
134.0	55010	62908	6428373	28.38708	-79.95340
135.0	55980	63802	6429344	28.38276	-79.93577

TABLE X (U)

TIME SEC	ALTITUDE M	RANGE M	E.C.DIST. M	LATITUDE DEG	LONGITUDE DEG
136.0	55957	65632	6430323	28.37834	-79.91777
137.0	57944	67501	6431311	28.37382	-79.89940
138.0	58939	69409	6432308	28.36920	-79.88065
139.0	59944	71355	6433314	28.36449	-79.86152
140.0	60958	73341	6434330	28.35967	-79.84201
141.0	61983	75369	6435356	28.35475	-79.82209
142.0	63018	77438	6436393	28.34973	-79.80176
143.0	64062	79546	6437439	28.34461	-79.78106
IEC0					
143.230	64305	80039	6437681	28.34341	-79.77621
144.0	65115	81689	6438493	28.33939	-79.76000
145.0	66176	83867	6439555	28.33409	-79.73862
146.0	67238	86066	6440110	28.32873	-79.71703
147.0	68303	88290	6441686	28.32331	-79.69520
148.0	69371	90537	6442756	28.31782	-79.67313
149.0	70435	92809	6443822	28.31228	-79.65083
DEC0					
149.230	70695	93338	6444082	28.31097	-79.64564
150.0	71522	95097	6444911	28.30661	-79.62840
151.0	72590	97394	6445980	28.30099	-79.60586
S-IV IGNITION					
151.310	72919	98106	6446309	28.29924	-79.59887
152.0	73649	99691	6447040	28.29535	-79.58332
153.0	74700	101989	6448093	28.28972	-79.56078
154.0	75743	104289	6449139	28.28407	-79.53822
155.0	76782	106594	6450178	28.27840	-79.51562
156.0	77814	108903	6451212	28.27272	-79.49297
157.0	78840	111217	6452240	28.26703	-79.47027
158.0	79861	113537	6453263	28.26131	-79.44754
159.0	80876	115861	6454280	28.25558	-79.42475
160.0	81885	118189	6455291	28.24983	-79.40193

TABLE X (II)

TIME SEC	ALTITUDE M	RANGE M	E.C.DIST. M	LATITUDE DEG	LONGITUDE DEG
161.0	82888	120523	6456296	28.24406	-79.37906
162.0	83886	122861	6457296	28.23828	-79.35614
163.0	84879	125205	6458290	28.23248	-79.33318
164.0	85865	127553	6459278	28.22666	-79.31017
165.0	85847	129907	6460261	28.22082	-79.28712
166.0	87822	132266	6461239	28.21497	-79.26402
167.0	88792	134630	6462211	28.20909	-79.24087
168.0	89757	136999	6463177	28.20320	-79.21767
169.0	90716	139373	6464139	28.19729	-79.19442
170.0	91670	141753	6465094	28.19136	-79.17113
171.0	92619	144138	6466045	28.18542	-79.14779
172.0	93562	146527	6466990	28.17945	-79.12440
173.0	94500	148922	6467929	28.17346	-79.10097
174.0	95433	151322	6468864	28.16745	-79.07749
175.0	96360	153727	6469793	28.16142	-79.05396
176.0	97283	156137	6470718	28.15537	-79.03040
177.0	98201	158553	6471638	28.14929	-79.00678
178.0	99114	160973	6472552	28.14318	-78.98313
179.0	100022	163398	6473462	28.13706	-78.95943
180.0	100924	165828	6474367	28.13091	-78.93568
181.0	101822	168263	6475267	28.12473	-78.91189
182.0	102715	170704	6476162	28.11853	-78.88806
183.0	103604	173149	6477052	28.11231	-78.86418
184.0	104487	175600	6477937	28.10607	-78.84025
185.0	105365	178056	6478817	28.09980	-78.81628
186.0	106239	180517	6479693	28.09351	-78.79226
187.0	107107	182983	6480563	28.08720	-78.76820
188.0	107971	185454	6481429	28.08086	-78.74409
189.0	108829	187931	6482289	28.07450	-78.71994
190.0	109683	190413	6483145	28.06812	-78.69573
191.0	110532	192900	6483996	28.06172	-78.67148
192.0	111376	195393	6484842	28.05529	-78.64718
193.0	112214	197890	6485682	28.04884	-78.62284
194.0	113049	200394	6486518	28.04236	-78.59845
195.0	113877	202902	6487349	28.03587	-78.57401
196.0	114702	205416	6488176	28.02935	-78.54952
197.0	115521	207935	6488997	28.02281	-78.52498
198.0	116335	210460	6489813	28.01625	-78.50040
199.0	117145	212990	6490625	28.00966	-78.47576
200.0	117950	215526	6491432	28.00305	-78.45108

TABLE X. (U)

TIME SEC	ALTITUDE M	RANGE M	E.C.DIST. M	LATITUDE DEG	LONGITUDE DEG
201.0	118749	218067	6492233	27.99642	-78.42635
202.0	119544	220613	6493031	27.98977	-78.40157
203.0	120335	223165	6493823	27.98310	-78.37675
204.0	121120	225722	6494610	27.97640	-78.35187
205.0	121901	228285	6495393	27.96968	-78.32694
206.0	122677	230854	6496171	27.96293	-78.30197
207.0	123448	233427	6496944	27.95617	-78.27694
208.0	124214	236007	6497713	27.94939	-78.25187
209.0	124976	238592	6498477	27.94258	-78.22675
210.0	125733	241182	6499236	27.93575	-78.20157
211.0	126486	243778	6499990	27.92890	-78.17635
212.0	127233	246380	6500740	27.92202	-78.15108
213.0	127976	248987	6501485	27.91513	-78.12575
214.0	128715	251599	6502226	27.90821	-78.10038
215.0	129449	254218	6502962	27.90127	-78.07495
216.0	130178	256842	6503693	27.89431	-78.04948
217.0	130902	259471	6504420	27.88732	-78.02395
218.0	131622	262107	6505142	27.88032	-77.99838
219.0	132337	264748	6505859	27.87329	-77.97275
220.0	133048	267394	6505572	27.86624	-77.94707
221.0	133754	270047	6507281	27.85917	-77.92134
222.0	134456	272705	6507984	27.85207	-77.89556
223.0	135153	275369	6508684	27.84496	-77.86972
224.0	135845	278039	6509378	27.83782	-77.84383
225.0	136533	280715	6510068	27.83066	-77.81790
226.0	137216	283396	6510753	27.82347	-77.79190
227.0	137895	286083	6511434	27.81627	-77.76586
228.0	138569	288776	6512111	27.80904	-77.73976
229.0	139239	291475	6512783	27.80179	-77.71361
230.0	139904	294180	6513450	27.79452	-77.68741
231.0	140564	296891	6514112	27.78722	-77.66115
232.0	141220	299608	6514771	27.77990	-77.63484
233.0	141871	302330	6515424	27.77256	-77.60848
234.0	142518	305059	6516074	27.76520	-77.58206
235.0	143161	307794	6516718	27.75782	-77.55559
236.0	143799	310534	6517358	27.75041	-77.52907
237.0	144432	313281	6517994	27.74298	-77.50249
238.0	145061	316034	65186.6	27.73553	-77.47585
239.0	145686	318793	6519252	27.72805	-77.44917
240.0	146306	321557	6519875	27.72055	-77.42243

TABLE X (U)

TIME SEC	ALTITUDE M	RANGE M	E.C.DIST. M	LATITUDE DEG	LONGITUDE DEG
241.0	146922	324328	6520493	27.71303	-77.39563
242.0	147533	327105	6521107	27.70549	-77.36878
243.0	148141	329888	6521716	27.69792	-77.34187
244.0	148743	332677	6522321	27.69033	-77.31491
245.0	149342	335472	6522922	27.68272	-77.28790
246.0	149936	338273	6523518	27.67508	-77.26083
247.0	150525	341081	6524110	27.66742	-77.23370
248.0	151111	343895	6524698	27.65974	-77.20652
249.0	151692	346714	6525282	27.65203	-77.17928
250.0	152269	349540	6525861	27.64430	-77.15199
251.0	152841	352372	6526436	27.63655	-77.12465
252.0	153410	355211	6527006	27.62877	-77.09724
253.0	153974	358055	6527573	27.62098	-77.06978
254.0	154534	360906	6528135	27.61315	-77.04227
255.0	155089	363763	6528693	27.60531	-77.01470
256.0	155641	366626	6529247	27.59743	-76.98707
257.0	156188	369496	6529797	27.58954	-76.95939
258.0	156731	372372	6530342	27.58162	-76.93165
259.0	157269	375254	6530883	27.57368	-76.90386
260.0	157804	378142	6531420	27.56572	-76.87600
261.0	158335	381037	6531953	27.55773	-76.84809
262.0	158861	383938	6532482	27.54972	-76.82013
263.0	159383	386846	6533007	27.54168	-76.79211
264.0	159901	389759	6533527	27.53362	-76.76403
265.0	160415	392679	6534044	27.52553	-76.73589
266.0	160926	395606	6534556	27.51742	-76.70770
267.0	161431	398539	6535065	27.50929	-76.67945
268.0	161933	401478	6535569	27.50113	-76.65115
269.0	162431	404424	6536069	27.49295	-76.62278
270.0	162925	407376	6536566	27.48474	-76.59436
271.0	163415	410334	6537058	27.47651	-76.56589
272.0	163901	413299	6537546	27.46825	-76.53735
273.0	164382	416270	6538031	27.45997	-76.50876
274.0	164860	419248	6538511	27.45167	-76.48011
275.0	165334	422233	6538988	27.44333	-76.45140
276.0	165804	425224	6539460	27.43498	-76.42263
277.0	166270	428221	6539929	27.42660	-76.39381
278.0	166732	431225	6540393	27.41819	-76.36492
279.0	167191	434236	6540854	27.40976	-76.33598
280.0	167645	437253	6541311	27.40130	-76.30698

TABLE X (U)

TIME SEC	ALTITUDE M	RANGE M	E.C.DIST. M	LATITUDE DEG	LONGITUDE DEG
281.0	168096	440277	6541764	27.39282	-76.27792
282.0	168542	443308	6542214	27.38431	-76.24880
283.0	168985	446345	6542659	27.37577	-76.21962
284.0	169424	449388	6543101	27.36721	-76.19039
285.0	169859	452439	6543538	27.35863	-76.16109
286.0	170291	455496	6543972	27.35002	-76.13174
287.0	170718	458559	6544402	27.34138	-76.10233
288.0	171142	461629	6544829	27.33272	-76.07286
289.0	171562	464706	6545252	27.32403	-76.04333
290.0	171979	467790	6545671	27.31531	-76.01374
291.0	172391	470880	6546086	27.30657	-75.98409
292.0	172800	473977	6546498	27.29780	-75.95438
293.0	173205	477081	6546905	27.28901	-75.92461
294.0	173607	480192	6547310	27.28019	-75.89478
295.0	174005	483309	6547710	27.27134	-75.86490
296.0	174399	486433	6548107	27.26246	-75.83495
297.0	174790	489564	6548500	27.25356	-75.80494
298.0	175177	492702	6548890	27.24463	-75.77487
299.0	175560	495846	6549276	27.23568	-75.74475
300.0	175940	498997	6549659	27.22670	-75.71456
301.0	176316	502156	6550038	27.21764	-75.68431
302.0	176688	505321	6550413	27.20865	-75.65400
303.0	177057	508493	6550784	27.19959	-75.62363
304.0	177423	511672	6551153	27.19050	-75.59320
305.0	177785	514857	6551517	27.18138	-75.56271
306.0	178143	518050	6551878	27.17223	-75.53215
307.0	178498	521250	6552236	27.16306	-75.50154
308.0	178849	524457	6552590	27.15386	-75.47086
309.0	179197	527671	6552940	27.14463	-75.44012
310.0	179541	530892	6553287	27.13537	-75.40932
311.0	179882	534120	6553631	27.12608	-75.37846
312.0	180219	537356	6553971	27.11677	-75.34753
313.0	180552	540598	6554307	27.10743	-75.31654
314.0	180882	543847	6554640	27.09805	-75.28549
315.0	181209	547104	6554970	27.08865	-75.25438
316.0	181532	550368	6555296	27.07922	-75.22320
317.0	181852	553639	6555618	27.06976	-75.19196
318.0	182168	556918	6555937	27.06028	-75.16065
319.0	182481	560204	6555253	27.05076	-75.12928
320.0	182791	563497	6556565	27.04121	-75.09785

TABLE X (U)

TIME SEC	ALTITUDE M	RANGE M	E.C.DIST. M	LATITUDE DEG	LONGITUDE DEG
321.0	183097	566797	6556874	27.03164	-75.06635
322.0	183399	570104	6557180	27.02203	-75.03479
323.0	183698	573419	6557482	27.01240	-75.00317
324.0	183994	576742	6557781	27.00273	-74.97148
325.0	184287	580071	6558076	26.99304	-74.93973
326.0	184576	583408	6558368	26.98331	-74.90791
327.0	184862	586753	6558657	26.97356	-74.87603
328.0	185144	590105	6558942	26.96377	-74.84408
329.0	185423	593464	6559224	26.95395	-74.81207
330.0	185699	596831	6559503	26.94411	-74.77999
331.0	185972	600206	6559778	26.93423	-74.74784
332.0	186241	603588	6560051	26.92433	-74.71563
333.0	186507	606978	6560320	26.91439	-74.68336
334.0	186769	610375	6560585	26.90442	-74.65101
335.0	187029	613780	6560847	26.89442	-74.61860
336.0	187285	617192	6561106	26.88439	-74.58613
337.0	187537	620612	6561362	26.87432	-74.55359
338.0	187787	624040	6561615	26.86423	-74.52098
339.0	188033	627476	6561864	26.85410	-74.48830
340.0	188276	630919	6562110	26.84395	-74.45556
341.0	188516	634370	6562353	26.83376	-74.42275
342.0	188753	637829	6562593	26.82354	-74.38987
343.0	188987	641295	6562830	26.81329	-74.35692
344.0	189217	644770	6563063	26.80300	-74.32391
345.0	189444	648252	6563294	26.79268	-74.29083
346.0	189668	651742	6563521	26.78234	-74.25768
347.0	189889	655240	6563745	26.77195	-74.22446
348.0	190107	658746	6563966	26.76154	-74.19117
349.0	190322	662260	6564184	26.75109	-74.15782
350.0	190534	665782	6564398	26.74061	-74.12439
351.0	190742	669312	6564610	26.73009	-74.09090
352.0	190948	672850	6564819	26.71955	-74.05734
353.0	191150	676395	6565025	26.70897	-74.02371
354.0	191350	679949	6565227	26.69835	-73.99000
355.0	191546	683511	6565427	26.68770	-73.95623
356.0	191739	687081	6565623	26.67702	-73.92239
357.0	191930	690660	6565817	26.66631	-73.88848
358.0	192117	694246	6566007	26.65556	-73.85450
359.0	192301	697841	6566195	26.64478	-73.82044
360.0	192483	701443	6566379	26.63396	-73.78632

TABLE X (U)

TIME SEC	ALTITUDE M	RANGE M	E.C.DIST. M	LATITUDE DEG	LONGITUDE DEG
361.0	192661	705054	6566561	26.62311	-73.75213
362.0	192836	708674	6566739	26.61222	-73.71786
363.0	193009	712301	6566915	26.60130	-73.68352
364.0	193178	715937	6567088	26.59035	-73.64912
365.0	193345	719581	6567258	26.57936	-73.61464
366.0	193509	723233	6567425	26.56833	-73.58009
367.0	193669	726894	6567589	26.55727	-73.54546
368.0	193827	730563	6567750	26.54617	-73.51077
369.0	193982	734241	6567908	26.53504	-73.47600
370.0	194134	737927	6568064	26.52388	-73.44116
371.0	194284	741622	6568216	26.51267	-73.40625
372.0	194430	745325	6568366	26.50144	-73.37126
373.0	194574	749036	6568513	26.49016	-73.33620
374.0	194715	752756	6568658	26.47885	-73.30107
375.0	194853	756485	6568799	26.46751	-73.26587
376.0	194988	760222	6568938	26.45613	-73.23059
377.0	195121	763968	6569074	26.44471	-73.19523
378.0	195251	767722	6569207	26.43325	-73.15981
379.0	195378	771486	6569337	26.42176	-73.12431
380.0	195502	775258	6569465	26.41023	-73.08873
381.0	195624	779038	6569590	26.39866	-73.05308
382.0	195743	782828	6569713	26.38706	-73.01736
383.0	195859	786626	6559832	26.37542	-72.98156
384.0	195973	790432	6569949	26.36374	-72.94568
385.0	196084	794248	6570064	26.35203	-72.90973
386.0	196192	798073	6570175	26.34027	-72.87371
387.0	196297	801906	6570285	26.32848	-72.83761
388.0	196400	805749	6570391	26.31665	-72.80143
389.0	196501	809600	6570495	26.30478	-72.76517
390.0	196598	813460	6570596	26.29288	-72.72885
391.0	196693	817329	6570695	26.28093	-72.69244
392.0	196786	821208	6570791	26.26895	-72.65596
393.0	196874	825095	6570884	26.25693	-72.61940
394.0	196963	828991	6570975	26.24487	-72.58276
395.0	197049	832897	6571064	26.23277	-72.54605
396.0	197131	836811	6571150	26.22063	-72.50925
397.0	197211	840735	6571233	26.20845	-72.47238
398.0	197288	844668	6571315	26.19623	-72.43544
399.0	197363	848610	6571393	26.18397	-72.39841
400.0	197436	852562	6571469	26.17168	-72.36130

TABLE X (U)

TIME SEC	ALTITUDE M	RANGE M	E.C.DIST. M	LATITUDE DEG	LØNGITUDE DEG
401.0	197506	856523	6571543	26.15934	-72.32412
402.0	197573	860493	6571614	26.14696	-72.28686
403.0	197639	864472	6571683	26.13454	-72.24951
404.0	197701	868461	6571749	26.12208	-72.21209
405.0	197762	872459	6571813	26.10958	-72.17459
406.0	197819	876467	6571875	26.09704	-72.13701
407.0	197875	880484	6571934	26.08446	-72.09935
408.0	197928	884511	6571990	26.07184	-72.06160
409.0	197978	888547	6572045	26.05917	-72.02378
410.0	198026	892593	6572096	26.04647	-71.98588
411.0	198072	896649	6572146	26.03372	-71.94789
412.0	198116	900714	6572193	26.02093	-71.90982
413.0	198157	904789	6572238	26.00810	-71.87167
414.0	198196	908873	6572281	25.99523	-71.83344
415.0	198232	912968	6572321	25.98231	-71.79513
416.0	198266	917072	6572359	25.96935	-71.75673
417.0	198298	921186	6572394	25.95635	-71.71825
418.0	198327	925310	6572427	25.94331	-71.67969
419.0	198354	929444	6572459	25.93022	-71.64104
420.0	198379	933588	6572487	25.91709	-71.60231
421.0	198402	937741	6572514	25.90391	-71.56349
422.0	198422	941905	6572538	25.89070	-71.52459
423.0	198440	946079	6572560	25.87743	-71.48561
424.0	198456	950263	6572580	25.86413	-71.44654
425.0	198470	954457	6572597	25.85077	-71.40739
426.0	198481	958661	6572613	25.83738	-71.36815
427.0	198491	962875	6572626	25.82394	-71.32883
428.0	198498	967100	6572637	25.81046	-71.28941
429.0	198503	971335	6572646	25.79692	-71.24992
430.0	198506	975580	6572652	25.78335	-71.21034
431.0	198506	979835	6572657	25.76973	-71.17067
432.0	198505	984101	6572660	25.75606	-71.13091
433.0	198501	988378	6572660	25.74235	-71.09107
434.0	198495	992664	6572658	25.72860	-71.05114
435.0	198483	996961	6572654	25.71479	-71.01112
436.0	198478	1001269	6572648	25.70094	-70.97101
437.0	198466	1005587	6572640	25.58705	-70.93081
438.0	198451	1009916	6572630	25.67310	-70.89053
439.0	198435	1014255	6572618	25.65911	-70.85016
440.0	198417	1018605	6572604	25.64508	-70.80970

TABLE X (U)

TIME SEC	ALTITUDE M	RANGE M	E.C.DIST. M	LATITUDE DEG	LØNGITUDE DEG
441.0	198397	1022966	6572588	25.63099	-70.76915
442.0	198375	1027337	6572570	25.61686	-70.72851
443.0	198351	1031720	6572550	25.60268	-70.68778
444.0	198324	1036112	6572528	25.58846	-70.64696
445.0	198296	1040516	6572504	25.57418	-70.60605
446.0	198266	1044931	6572478	25.55986	-70.56505
447.0	198235	1049356	6572450	25.54549	-70.52396
448.0	198201	1053793	6572421	25.53107	-70.48279
449.0	198165	1058240	6572390	25.51660	-70.44151
450.0	198128	1062698	6572356	25.50208	-70.40015
451.0	198089	1067167	6572321	25.48752	-70.35870
452.0	198048	1071648	6572285	25.45823	-70.27551
453.0	198005	1076139	6572245	25.44352	-70.23378
454.0	197961	1080642	6572205	25.42875	-70.19196
455.0	197915	1085155	6572164	25.41394	-70.15004
456.0	197867	1089680	6572121	25.39908	-70.10804
457.0	197818	1094216	6572076	25.38416	-70.06593
458.0	197766	1098763	6572029	25.36919	-70.02374
459.0	197714	1103322	6571980	25.35418	-69.98145
460.0	197659	1107892	6571930	25.33911	-69.93907
461.0	197604	1112473	6571879	25.32399	-69.89659
462.0	197546	1117065	6571825	25.30882	-69.85402
463.0	197487	1121670	6571771	25.29360	-69.81135
464.0	197426	1126285	6571715	25.27832	-69.76859
465.0	197364	1130912	6571657	25.26300	-69.72573
466.0	197301	1135551	6571598	25.24762	-69.68278
467.0	197235	1140201	6571537	25.23218	-69.63973
468.0	197169	1144863	6571475	25.21670	-69.59659
469.0	197101	1149537	6571411	25.20116	-69.55335
470.0	197031	1154222	6571346	25.18557	-69.51001
471.0	196960	1158919	6571279	25.16993	-69.46657
472.0	196888	1163628	6571212	25.15423	-69.42304
473.0	196814	1168348	6571142	25.13848	-69.37941
474.0	196739	1173081	6571072	25.12267	-69.33568
475.0	196663	1177826	6571000	25.10681	-69.29185
476.0	196585	1182582	6570927	25.09090	-69.24792
477.0	196506	1187351	6570852	25.07493	-69.20390
478.0	196425	1192131	6570775	25.05890	-69.15977
479.0	196344	1196924	6570699	25.04282	-69.11555
480.0	196260	1201729	6570620		

TABLE X (U)

TIME SEC	ALTITUDE M	RANGE M	E.C.DIST. M	LATITUDE DEG	LONGITUDE DEG
481.0	196176	1206546	6570541	25.02669	-69.07122
482.0	196091	1211375	6570460	25.01050	-69.02680
483.0	196004	1216217	6570378	24.99425	-68.98227
484.0	195916	1221071	6570294	24.97795	-68.93765
485.0	195827	1225937	6570210	24.96159	-68.89292
486.0	195736	1230816	6570124	24.94517	-68.84809
487.0	195645	1235707	6570037	24.92870	-68.80316
488.0	195552	1240611	6569949	24.91216	-68.75812
489.0	195458	1245527	6569860	24.89558	-68.71298
490.0	195363	1250457	6569770	24.87893	-68.66774
491.0	195267	1255398	6569679	24.86222	-68.62240
492.0	195170	1260353	6569586	24.84546	-68.57695
493.0	195072	1265320	6569493	24.82864	-68.53140
494.0	194973	1270300	6569398	24.81176	-68.48574
495.0	194872	1275293	6569303	24.79482	-68.43998
496.0	194771	1280298	6569206	24.77782	-68.39411
497.0	194669	1285317	6569109	24.76076	-68.34814
498.0	194565	1290349	6569010	24.74364	-68.30206
499.0	194461	1295394	6568911	24.72647	-68.25587
500.0	194356	1300451	6568811	24.70923	-68.20958
501.0	194250	1305522	6568709	24.69193	-68.16319
502.0	194143	1310606	6568607	24.67457	-68.11668
503.0	194035	1315704	6568504	24.65715	-68.07007
504.0	193927	1320814	6568401	24.63966	-68.02335
505.0	193817	1325938	6568296	24.62212	-67.97653
506.0	193707	1331075	6568191	24.60451	-67.92959
507.0	193597	1336226	6568085	24.58685	-67.88255
508.0	193485	1341390	6567979	24.56911	-67.83539
509.0	193373	1346568	6567872	24.55132	-67.78813
510.0	193260	1351759	6567764	24.53346	-67.74076
511.0	193146	1356963	6567655	24.51555	-67.69328
512.0	193032	1362182	6567546	24.49756	-67.64569
513.0	192917	1367414	6567436	24.47952	-67.59798
514.0	192801	1372660	6567326	24.46140	-67.55017
515.0	192686	1377920	6567215	24.44323	-67.50224
516.0	192569	1383194	6567103	24.42499	-67.45420
517.0	192452	1388481	6566991	24.40668	-67.40605
518.0	192334	1393783	6566879	24.38831	-67.35779
519.0	192216	1399098	6566766	24.36988	-67.30941
520.0	192097	1404428	6566652	24.35137	-67.26092

TABLE X (U)

TIME SEC	ALTITUDE M	RANGE M	E.C.DIST. M	LATITUDE DEG	LONGITUDE DEG
521.0	191978	1409772	6566538	24.33281	-67.21232
522.0	191859	1415130	6566424	24.31417	-67.16360
523.0	191739	1420503	6566309	24.29547	-67.11477
524.0	191619	1425889	6566194	24.27670	-67.06582
525.0	191498	1431290	6566079	24.25786	-67.01676
526.0	191377	1436706	6565963	24.23896	-66.96758
527.0	191256	1442136	6565847	24.21999	-66.91828
528.0	191134	1447580	6565731	24.20095	-66.86887
529.0	191012	1453040	6565614	24.18184	-66.81933
530.0	190890	1458513	6565498	24.16266	-66.76969
531.0	190768	1464002	6565381	24.14341	-66.71992
532.0	190646	1469505	6565264	24.12409	-66.67004
533.0	190523	1475023	6565147	24.10470	-66.56991
534.0	190401	1480556	6565030	24.08525	-66.51967
535.0	190278	1486104	6564912	24.06572	-66.46931
536.0	190155	1491667	6564795	24.04612	-66.41883
537.0	190033	1497245	6564678	24.02645	-66.36823
538.0	189910	1502838	6564560	24.00671	-66.31751
539.0	189787	1508446	6564443	23.98690	-66.26667
540.0	189665	1514069	6564326	23.96702	-66.21570
541.0	189542	1519708	6564209	23.94706	-66.16461
542.0	189420	1525362	6564092	23.92703	-66.11341
543.0	189298	1531031	6563975	23.90693	-66.06207
544.0	189175	1536716	6563859	23.88675	-66.01062
545.0	189053	1542416	6563742	23.86651	-65.95903
546.0	188932	1541132	6563626	23.84618	-65.90733
547.0	188811	1553864	6563511	23.82578	-65.85550
548.0	188689	1559611	6563395	23.80531	-65.80355
549.0	188569	1565374	6563280	23.78476	-65.75147
550.0	188448	1571153	6563165	23.76414	-65.69927
551.0	188328	1576947	6563051	23.74344	-65.64693
552.0	188209	1582758	6562937	23.72267	-65.59447
553.0	188090	1588585	6562824	23.70182	-65.54189
554.0	187971	1594427	6562711	23.68089	-65.48917
555.0	187853	1600286	6562598	23.65989	-65.43633
556.0	187735	1606161	6562487	23.63880	-65.38336
557.0	187619	1612052	6562376	23.61764	-65.33026
558.0	187502	1617959	6562265	23.59641	-65.27703
559.0	187385	1623884	6562155	23.57509	-65.22367
560.0	187271	1629824	6562046	23.55369	

TABLE X (U)

TIME SEC	ALTITUDE M	RANGE M	E.C.DIST. M	LATITUDE DEG	LONGITUDE DEG
561.0	187157	1635781	6561938	23.53222	-65.17018
562.0	187044	1641755	6561830	23.51067	-65.11656
563.0	186931	1647745	6561723	23.48903	-65.06281
564.0	186819	1653753	6561617	23.46731	-65.00892
565.0	186707	1659777	6561511	23.44552	-64.95490
566.0	186597	1665818	6561407	23.42364	-64.90074
567.0	186487	1671876	6561303	23.40168	-64.84646
568.0	186378	1677951	6561200	23.37963	-64.79203
569.0	186270	1684044	6561098	23.35751	-64.73748
570.0	186163	1690154	6560997	23.33530	-64.68278
571.0	186058	1696281	6560897	23.31301	-64.62795
572.0	185953	1702425	6560798	23.29063	-64.57298
573.0	185849	1708587	6560700	23.26817	-64.51788
574.0	185746	1714767	6560603	23.24562	-64.46264
575.0	185644	1720964	6560507	23.22299	-64.40726
576.0	185543	1727179	6560413	23.20027	-64.35174
577.0	185443	1733411	6560319	23.17747	-64.29608
578.0	185344	1739662	6560226	23.15458	-64.24020
579.0	185247	1745930	6560135	23.13161	-64.18434
580.0	185151	1752217	6560045	23.10855	-64.12826
581.0	185056	1758522	6559956	23.08539	-64.07204
582.0	184962	1764844	6559869	23.06216	-64.01568
583.0	184870	1771185	6559783	23.03883	-63.95917
584.0	184779	1777545	6559699	23.01541	-63.90252
585.0	184690	1783923	6559615	22.99190	-63.84572
586.0	184602	1790319	6559534	22.96831	-63.78878
587.0	184515	1796735	6559454	22.94462	-63.73169
588.0	184431	1803168	6559375	22.92084	-63.67446
589.0	184347	1809621	6559298	22.89697	-63.61708
590.0	184266	1816092	6559223	22.87301	-63.55956
591.0	184186	1822583	6559149	22.84896	-63.50189
592.0	184108	1829092	6559078	22.82481	-63.44407
593.0	184031	1835621	6559008	22.80057	-63.38610
594.0	183956	1842168	6558940	22.77624	-63.32798
595.0	183884	1848735	6558873	22.75181	-63.26971
596.0	183813	1855322	6558809	22.72729	-63.21130
597.0	183744	1861928	6558747	22.70267	-63.15273
598.0	183677	1868553	6558687	22.67796	-63.09401
599.0	183613	1875198	6558628	22.65355	-63.03513
600.0	183550	1881862	6558572	22.62824	-62.97611

TABLE X (U)

TIME SEC	ALTITUDE M	RANGE M	E.C.DIST. M	LATITUDE DEG	LONGITUDE DEG
601.0	183489	1888547	6558518	22.60324	-62.91693
602.0	183439	1895251	6558466	22.57814	-62.85759
603.0	183374	1901976	6558416	22.55294	-62.79811
604.0	183320	1908720	6558369	22.52764	-62.73846
605.0	183268	1915485	6558323	22.50224	-62.67866
606.0	183218	1922270	6558280	22.47675	-62.61870
607.0	183171	1929075	6558240	22.45115	-62.55859
608.0	183126	1935901	6558202	22.42546	-62.49832
609.0	183094	1942748	6558166	22.39966	-62.43789
610.0	183044	1949615	6558133	22.37376	-62.37729
611.0	183006	1956503	6558102	22.34775	-62.31654
612.0	182971	1963412	6558074	22.32165	-62.25563
613.0	182939	1970342	6558049	22.29544	-62.19455
614.0	182910	1977292	6558026	22.26913	-62.13332
615.0	182883	1984265	6558006	22.24271	-62.07191
616.0	182859	1991258	6557989	22.21619	-62.01035
617.0	182838	1998273	6557975	22.18956	-61.94862
618.0	182819	2005310	6557963	22.16282	-61.88672
619.0	182804	2012368	6557954	22.13598	-61.82466
620.0	182791	2019447	6557949	22.10903	-61.76243
621.0	182781	2026549	6557946	22.08198	-61.70004
622.0	182775	2033672	6557946	22.05481	-61.63748
623.0	182771	2040818	6557950	22.02754	-61.57474
624.0	182770	2047985	6557956	22.00016	-61.51184

## S-IV CUTOFF SIGNAL

624.860	182772	2054170	6557964	21.97651	-61.45758
625.0	182773	2055175	6557966	21.97266	-61.44877
626.0	182777	2062376	6557977	21.94510	-61.38562
627.0	182781	2069577	6557988	21.91751	-61.32251
628.0	182785	2076778	6558000	21.88989	-61.25941
629.0	182790	2083979	6558011	21.86225	-61.19634
630.0	182794	2091180	6558022	21.83457	-61.13330
631.0	182798	2098381	6558034	21.80687	-61.07029
632.0	182802	2105582	6558045	21.77915	-61.00730
633.0	182807	2112783	6558056	21.75139	-60.94433
634.0	182811	2119984	6558068	21.72361	-60.88140

## INSERTION

634.860	182814	2126176	6558077	21.69969	-60.82729
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TABLE XI (U)

TIME SEC	EARTH-VEL M/SEC.	MACH	DYNPRES N/CM SQ	VEL-ELEV DEG	VEL-AZ DEG	SPACE-VEL M/SEC
FIRST MOTION						
0.170	0.	0.016	0.00191	90.000	0.	408.9
LIFTOFF SIGNAL						
0.400	0.7	0.017	0.00194	88.470	225.114	408.9
1.0	2.6	0.018	0.00230	88.995	239.122	408.9
2.0	5.8	0.023	0.00377	89.375	283.444	408.9
3.0	9.0	0.030	0.00641	89.297	319.033	409.0
4.0	12.3	0.038	0.01038	89.182	332.117	409.0
5.0	15.7	0.047	0.01583	89.132	336.446	409.1
6.0	19.3	0.057	0.02290	89.132	337.359	409.3
7.0	23.0	0.067	0.03172	89.151	336.797	409.4
8.0	26.8	0.078	0.04235	89.172	335.721	409.7
9.0	30.6	0.089	0.05489	89.183	334.716	409.9
10.0	34.6	0.100	0.06939	89.181	334.145	410.2
11.0	38.6	0.111	0.08594	89.167	334.202	410.5
12.0	42.7	0.123	0.10454	89.148	334.997	410.9
13.0	46.9	0.135	0.12529	89.132	336.665	411.4
14.0	51.2	0.148	0.14843	89.126	339.497	411.9
15.0	55.6	0.160	0.17409	89.138	344.075	412.5
16.0	60.1	0.173	0.20241	89.170	351.483	413.2
17.0	64.8	0.187	0.23352	89.209	3.343	414.1
18.0	69.5	0.201	0.26741	89.214	21.210	415.2
19.0	74.4	0.215	0.30399	89.114	42.983	416.4
20.0	79.3	0.229	0.34301	88.856	62.097	418.0
21.0	84.1	0.244	0.38348	88.400	75.418	419.8
22.0	89.0	0.258	0.42609	87.817	83.542	421.8
23.0	94.0	0.273	0.47104	87.143	88.738	424.2
24.0	99.0	0.288	0.51850	86.401	92.308	426.8
25.0	104.3	0.304	0.56948	85.601	94.954	429.7
26.0	109.6	0.320	0.62390	84.778	97.018	432.9
27.0	115.1	0.336	0.68132	83.915	98.604	436.4
28.0	120.6	0.353	0.74130	83.015	99.789	440.1
29.0	126.2	0.371	0.80413	82.084	100.693	444.1
30.0	131.9	0.388	0.87044	81.138	101.416	448.4

TABLE XI (U)

TIME SEC	EARTH-VEL M/SEC	MACH	DYNPRES N/CM SQ	VEL-ELEV DEG	VEL-AZ DEG	SPACE-VEL M/SEC
31.0	137.8	0.407	0.94210	90.180	102.058	452.9
32.0	143.9	0.426	1.01501	79.205	102.614	457.8
33.0	150.1	0.445	1.08755	78.194	103.076	462.9
34.0	156.4	0.464	1.16000	77.123	103.433	468.6
35.0	162.9	0.483	1.23330	75.990	103.680	474.6
36.0	169.5	0.502	1.30737	74.806	103.827	481.0
37.0	176.3	0.523	1.38915	73.600	103.921	487.8
38.0	183.3	0.545	1.47858	72.403	103.992	494.9
39.0	190.4	0.568	1.57163	71.242	104.066	502.2
40.0	197.7	0.591	1.66405	70.135	104.145	509.7
41.0	205.1	0.614	1.75700	59.086	104.234	517.3
42.0	212.7	0.638	1.85237	68.100	104.329	525.0
43.0	220.5	0.663	1.94946	67.178	104.408	532.8
44.0	228.5	0.680	2.05087	56.318	104.461	540.7
45.0	236.6	0.714	2.14825	55.515	104.492	548.7
46.0	244.8	0.740	2.24359	54.764	104.514	556.9
47.0	253.2	0.768	2.34975	54.059	104.543	565.1
48.0	261.7	0.799	2.47202	53.391	104.572	573.5
49.0	270.4	0.829	2.58132	52.749	104.595	582.0
50.0	279.2	0.857	2.67406	52.128	104.607	590.6
51.0	288.1	0.887	2.77841	51.525	104.611	599.4
52.0	297.1	0.919	2.87950	50.938	104.616	608.4
53.0	306.2	0.948	2.96432	50.367	104.620	617.5
54.0	315.3	0.978	3.04561	59.806	104.614	626.6

## MACH ONE

54.705	321.6	1.000	3.10308	59.413	104.595	633.0
55.0	324.2	1.009	3.12232	59.249	104.564	635.7
56.0	333.1	1.037	3.17881	58.692	104.524	644.8
57.0	342.0	1.067	3.23568	58.142	104.445	654.0
58.0	350.9	1.099	3.30534	57.612	104.362	663.2
59.0	359.9	1.135	3.38139	57.111	104.288	672.5
60.0	369.0	1.170	3.44778	56.638	104.219	681.9
61.0	378.4	1.204	3.49738	56.187	104.144	691.4
62.0	388.0	1.237	3.53136	55.748	104.064	701.2
63.0	397.8	1.272	3.56946	55.322	103.996	711.3
64.0	407.9	1.313	3.62428	54.917	103.956	721.5
65.0	418.3	1.354	3.67175	54.541	103.955	731.9

TABLE XI (U)

TIME SEC	EARTH-VEL M/SEC	MACH	DYNPRES N/CM SQ	VEL-ELEV DEG	VEL-AZ DEG	SPACE-VEL M/SEC
66.0	428.8	1.401	3.73991	54.236	103.945	742.3
67.0	439.6	1.446	3.78189	53.955	103.945	752.8
68.0	450.7	1.496	3.83559	53.690	103.955	763.6
69.0	462.0	1.550	3.89364	53.431	103.973	774.7
70.0	473.6	1.604	3.93613	53.173	103.998	786.0
71.0	485.4	1.657	3.95920	52.910	104.030	797.7
72.0	497.7	1.716	3.99811	52.635	104.068	809.8

## MAXIMUM DYNAMIC PRESSURE

72.500	503.9	1.745	4.00302	52.492	104.088	815.9
73.0	510.2	1.769	3.98420	52.344	104.110	822.2
74.0	523.1	1.813	3.92370	52.032	104.156	835.1
75.0	536.4	1.858	3.85545	51.676	104.205	848.5
76.0	550.2	1.912	3.80840	51.305	104.249	862.5
77.0	564.3	1.966	3.75248	50.880	104.289	877.2
78.0	578.9	2.013	3.65581	50.459	104.347	892.1
79.0	593.8	2.064	3.57027	50.040	104.418	907.5
80.0	609.1	2.122	3.49957	49.624	104.492	923.3
81.0	624.8	2.185	3.43474	49.205	104.554	939.5
82.0	640.9	2.242	3.33710	48.786	104.599	956.1
83.0	657.4	2.287	3.20510	48.355	104.630	973.2
84.0	674.4	2.351	3.12232	47.943	104.653	990.7
85.0	691.7	2.401	2.99831	47.520	104.676	1008.7
86.0	709.5	2.463	2.90135	47.100	104.693	1027.2
87.0	727.7	2.505	2.75534	46.677	104.709	1046.1
88.0	746.4	2.560	2.64478	46.250	104.726	1065.4
89.0	765.5	2.616	2.53092	45.821	104.735	1085.2
90.0	785.0	2.683	2.43837	45.383	104.737	1105.6
91.0	805.0	2.740	2.32932	44.934	104.749	1126.4
92.0	825.5	2.782	2.19735	44.475	104.770	1147.8
93.0	846.4	2.836	2.08585	44.010	104.795	1169.7
94.0	867.7	2.914	2.01286	43.545	104.822	1192.0
95.0	889.4	2.997	1.94470	43.083	104.845	1214.7
96.0	911.6	3.056	1.83816	42.628	104.864	1237.8
97.0	934.2	3.101	1.72540	42.176	104.878	1261.3
98.0	957.2	3.159	1.62635	41.722	104.892	1285.4
99.0	980.8	3.225	1.54470	41.267	104.911	1310.0
100.0	1004.9	3.305	1.47305	40.813	104.928	1335.1

TABLE XI (U)

TIME SEC	EARTH-VEL M/SEC	MACH	DYNPRES N/CM SQ	VEL-ELEV DEG	VEL-AZ DEG	SPACE-VEL M/SEC
101.0	1029.4	3.379	1.39128	40.361	104.945	1360.6
102.0	1054.4	3.456	1.31270	39.915	104.967	1386.6
103.0	1079.8	3.534	1.23617	39.478	104.987	1413.0
104.0	1105.6	3.613	1.16184	39.049	105.003	1439.9
105.0	1132.0	3.693	1.08991	38.626	105.018	1467.2
106.0	1158.8	3.775	1.02066	38.211	105.034	1495.0
107.0	1186.1	3.857	0.95409	37.801	105.048	1523.2
108.0	1213.9	3.934	0.89340	37.397	105.062	1552.0
109.0	1242.2	4.011	0.83582	36.997	105.078	1581.2
110.0	1271.1	4.089	0.78119	36.601	105.095	1611.0
111.0	1300.4	4.167	0.72929	36.217	105.113	1641.3
112.0	1330.2	4.245	0.69011	35.832	105.126	1672.0
113.0	1360.5	4.324	0.63358	35.453	105.143	1703.2
114.0	1391.5	4.405	0.58990	35.075	105.156	1735.1
115.0	1422.9	4.486	0.54875	34.701	105.164	1767.5
116.0	1454.9	4.567	0.51000	34.340	105.177	1800.3
117.0	1487.5	4.650	0.47368	33.971	105.194	1833.7

## ENGINE EIGHT PREMATURE SHUTDOWN

117.280	1496.5	4.673	0.46385	33.869	105.199	1843.0
118.0	1517.0	4.723	0.43780	33.622	105.211	1864.2
119.0	1545.8	4.793	0.40383	33.277	105.237	1893.8
120.0	1574.7	4.863	0.37233	32.934	105.258	1923.6
121.0	1604.2	4.935	0.34342	32.595	105.278	1953.9
122.0	1634.1	5.009	0.31675	32.260	105.298	1984.7
123.0	1664.6	5.086	0.29231	31.925	105.318	2015.9
124.0	1695.4	5.165	0.26973	31.596	105.334	2047.6
125.0	1726.9	5.247	0.24909	31.265	105.353	2079.9
126.0	1759.9	5.332	0.23006	30.938	105.369	2112.7
127.0	1791.3	5.422	0.21257	30.614	105.388	2145.9
128.0	1824.3	5.523	0.19694	30.289	105.403	2179.8
129.0	1857.9	5.638	0.18307	29.965	105.422	2214.1
130.0	1892.0	5.757	0.17005	29.642	105.438	2249.0
131.0	1926.7	5.881	0.15781	29.323	105.453	2284.5
132.0	1962.0	6.011	0.14629	29.009	105.472	2320.6
133.0	1997.9	6.145	0.13545	28.697	105.487	2357.3
134.0	2034.5	6.285	0.12525	28.390	105.502	2394.7
135.0	2071.9	6.430	0.11565	28.093	105.517	2432.7

TABLE XI (U)

TIME SEC	EARTH-VEL M/SEC	MACH	DYNPRES N/CM SQ	VEL-ELEV DEG	VEL-AZ DEG	SPACE-VEL M/SEC
136.0	2110.1	6.582	0.10666	27.830	105.533	2471.6
137.0	2148.1	6.737	0.09810	27.531	105.548	2510.4
138.0	2187.5	6.899	0.09011	27.265	105.564	2550.4
139.0	2227.5	7.066	0.08257	27.009	105.576	2591.0
140.0	2268.3	7.240	0.07549	26.766	105.592	2632.4
141.0	2309.7	7.419	0.06983	26.531	105.605	2674.4
142.0	2351.8	7.604	0.06257	26.305	105.607	2717.0
143.0	2394.9	7.796	0.05674	26.088	105.623	2760.6
IECE						
143.230	2404.9	7.841	0.05545	26.040	105.627	2770.7
144.0	2428.7	7.961	0.05089	25.889	105.637	2794.9
145.0	2452.7	8.096	0.04512	25.698	105.650	2819.4
146.0	2476.2	8.232	0.03989	25.514	105.666	2843.4
147.0	2499.9	8.371	0.03518	25.333	105.683	2867.6
148.0	2523.9	8.512	0.03095	25.156	105.699	2892.0
149.0	2548.2	8.656	0.02719	24.980	105.713	2916.7
ZECO						
149.230	2553.8	8.690	0.02632	24.942	105.717	2922.5
150.0	2559.0	8.757	0.02348	24.795	105.741	2928.0
151.0	2556.0	8.810	0.02009	24.623	105.754	2925.5
S-IV IGNITION						
151.310	2555.0	8.826	0.01912	24.570	105.759	2924.7
152.0	2552.7	8.862	0.01714	24.451	105.771	2922.8
153.0	2551.1	8.919	0.01464	24.280	105.785	2921.6
154.0	2552.1	8.986	0.01251	24.112	105.799	2923.1
155.0	2554.7	9.059	0.01058	23.944	105.811	2926.2
156.0	2557.3	9.133	0.00912	23.777	105.825	2929.2
157.0	2559.8	9.207	0.00777	23.612	105.840	2932.1
158.0	2562.3	9.284	0.00651	23.449	105.855	2935.1
159.0	2564.8	9.363	0.00562	23.287	105.871	2938.1
160.0	2567.4	9.444	0.00477	23.123	105.887	2941.1

TABLE XI (U)

TIME SEC	EARTH-VEL M/SEC	MACH	DYNPRES N/CM SQ	VEL-ELEV DEG	VEL-AZ DEG	SPACE-VEL M/SEC
161.0	2569.9	9.529	0.00405	22.958	105.901	2944.1
162.0	2572.7	9.548	0.00338	22.796	105.916	2947.3
163.0	2575.7	9.559	0.00292	22.636	105.931	2950.7
164.0	2578.7	9.571	0.00236	22.475	105.946	2954.2
165.0	2581.8	9.582	0.00198	22.314	105.961	2957.6
166.0	2584.9	9.593	0.00166	22.156	105.975	2961.1
167.0	2588.0	9.605	0.00139	21.996	105.989	2964.7
168.0	2591.1	9.617	0.00117	21.837	106.004	2968.2
169.0	2594.3	9.572	0.00097	21.680	106.019	2971.8
170.0	2597.5	9.509	0.00081	21.525	106.034	2975.4
171.0	2600.8	9.449	0.00067	21.369	106.051	2979.1
172.0	2604.0	9.391	0.00055	21.215	106.071	2982.7
173.0	2607.3	9.334	0.00047	21.066	106.095	2986.3
174.0	2610.6	9.279	0.00040	20.919	106.122	2990.0
175.0	2613.9	9.226	0.00034	20.772	106.152	2993.7
176.0	2617.3	9.175	0.00029	20.629	106.183	2997.3
177.0	2620.6	9.125	0.00025	20.487	106.214	3001.0
178.0	2624.0	9.076	0.00021	20.344	106.245	3004.7
179.0	2627.5	9.028	0.00018	20.200	106.275	3008.5
180.0	2630.9	8.945	0.00015	20.058	106.305	3012.2
181.0	2634.4	8.865	0.00013	19.917	106.334	3016.1
182.0	2638.0	8.788	0.00011	19.777	106.362	3019.9
183.0	2641.6	8.714	0.00010	19.636	106.390	3023.8
184.0	2645.2	8.643	0.00009	19.495	106.416	3027.8
185.0	2648.8	8.574	0.00007	19.354	106.441	3031.7
186.0	2652.4	8.508	0.00006	19.212	106.466	3035.6
187.0	2655.2	8.445	0.00006	19.074	106.492	3039.7
188.0	2661.0	8.383	0.00005	18.934	106.518	3043.8
189.0	2663.7	8.324	0.00004	18.793	106.543	3047.8
190.0	2667.5	8.267	0.00004	18.653	106.568	3051.9
191.0	2671.4	8.171	0.00003	18.515	106.593	3056.1
192.0	2675.3	8.056	0.00003	18.375	106.617	3060.3
193.0	2679.2	7.947	0.00003	18.235	106.640	3064.5
194.0	2683.1	7.844	0.00002	18.098	106.663	3068.7
195.0	2687.1	7.746	0.00002	17.961	106.687	3073.0
196.0	2691.2	7.653	0.00002	17.823	106.710	3077.3
197.0	2695.2	7.565	0.00002	17.687	106.732	3081.7
198.0	2699.3	7.481	0.00002	17.550	106.753	3086.0
199.0	2703.4	7.400	0.00001	17.416	106.776	3090.4
200.0	2707.6	7.323	0.00001	17.280	106.798	3094.9

TABLE XI (U)

TIME SEC	EARTH-VEL M/SEC	MACH	DYNPRES N/CM SQ	VEL-ELEV DEG	VEL-AZ DEG	SPACE-VEL M/SEC
201.0	2711.8	7.250	0.00001	17.147	106.818	3099.3
202.0	2715.9	7.180	0.00001	17.014	106.839	3103.8
203.0	2720.2	7.080	0.00001	16.882	106.861	3108.2
204.0	2724.4	6.944	0.00001	16.749	106.881	3112.8
205.0	2728.7	6.817	0.00001	16.618	106.901	3117.3
206.0	2733.1	6.699	0.00001	16.487	106.920	3121.9
207.0	2737.4	6.589	0.00001	16.356	106.940	3126.5
208.0	2741.8	6.494	0.00001	16.227	106.959	3131.1
209.0	2746.2	6.386	0.00001	16.098	106.978	3135.8
210.0	2750.6	6.294	0.00000	15.971	106.997	3140.5
211.0	2755.1	6.206	0.00000	15.843	107.016	3145.2
212.0	2759.6	6.124	0.00000	15.717	107.035	3150.0
213.0	2764.1	6.046	0.00000	15.590	107.053	3154.7
214.0	2768.7	5.971	0.00000	15.464	107.071	3159.5
215.0	2773.3	5.901	0.00000	15.338	107.089	3164.3
216.0	2777.9	5.834	0.00000	15.214	107.107	3169.2
217.0	2782.6	5.770	0.00000	15.089	107.125	3174.1
218.0	2787.3	5.709	0.00000	14.966	107.142	3179.1
219.0	2792.0	5.651	0.00000	14.842	107.159	3184.0
220.0	2796.8	5.596	0.00000	14.719	107.176	3189.0
221.0	2801.6	5.543	0.00000	14.596	107.193	3194.1
222.0	2806.5	5.492	0.00000	14.473	107.210	3199.1
223.0	2811.3	5.443	0.00000	14.351	107.227	3204.2
224.0	2816.2	5.397	0.00000	14.230	107.244	3209.3
225.0	2821.1	5.352	0.00000	14.109	107.260	3214.4
226.0	2826.0	5.309	0.00000	13.989	107.277	3219.5
227.0	2831.1	5.268	0.00000	13.871	107.293	3224.8
228.0	2836.1	5.229	0.00000	13.750	107.308	3230.0
229.0	2841.1	5.191	0.00000	13.630	107.325	3235.2
230.0	2846.2	5.154	0.00000	13.511	107.342	3240.5
231.0	2851.3	5.119	0.00000	13.393	107.358	3245.8
232.0	2856.4	5.085	0.00000	13.274	107.373	3251.2
233.0	2861.6	5.053	0.00000	13.158	107.388	3256.5
234.0	2866.8	5.022	0.00000	13.042	107.404	3261.9
235.0	2872.0	4.991	0.00000	12.925	107.420	3267.4
236.0	2877.3	4.962	0.00000	12.811	107.436	3272.8
237.0	2882.6	4.934	0.00000	12.697	107.451	3278.3
238.0	2887.9	4.907	0.00000	12.583	107.467	3283.7
239.0	2893.2	4.881	0.00000	12.469	107.482	3289.3
240.0	2898.6	4.856	0.00000	12.357	107.498	3294.8

TABLE XI (J)

TIME SEC	EARTH-VEL M/SEC	MACH	DYNPRES N/CM SQ	VEL-ELEV DEG	VEL-AZ DEG	SPACE-VEL M/SEC
241.0	2904.0	4.831	0.00000	12.245	107.513	3300.4
242.0	2909.4	4.807	0.00000	12.134	107.528	3305.9
243.0	2914.8	4.785	0.00000	12.023	107.544	3311.6
244.0	2920.3	4.763	0.00000	11.915	107.559	3317.2
245.0	2925.8	4.741	0.00000	11.805	107.574	3322.9
246.0	2931.3	4.721	0.00000	11.696	107.589	3328.6
247.0	2936.9	4.707	0.00000	11.587	107.604	3334.3
248.0	2942.4	4.695	0.00000	11.480	107.619	3340.0
249.0	2948.0	4.683	0.00000	11.372	107.635	3345.8
250.0	2953.6	4.672	0.00000	11.266	107.650	3351.5
251.0	2959.3	4.661	0.00000	11.161	107.665	3357.4
252.0	2965.0	4.650	0.00000	11.056	107.680	3363.2
253.0	2970.7	4.639	0.00000	10.951	107.695	3369.0
254.0	2976.4	4.629	0.00000	10.847	107.710	3374.9
255.0	2982.1	4.620	0.00000	10.744	107.725	3380.8
256.0	2987.9	4.610	0.00000	10.640	107.740	3386.7
257.0	2993.7	4.601	0.00000	10.537	107.755	3392.6
258.0	2999.5	4.592	0.00000	10.436	107.770	3398.6
259.0	3005.3	4.584	0.00000	10.335	107.785	3404.6
260.0	3011.2	4.576	0.00000	10.234	107.800	3410.6
261.0	3017.1	4.568	0.00000	10.134	107.815	3416.6
262.0	3023.0	4.560	0.00000	10.034	107.830	3422.6
263.0	3028.9	4.553	0.00000	9.936	107.845	3428.7
264.0	3034.8	4.546	0.00000	9.839	107.860	3434.8
265.0	3040.8	4.543	0.00000	9.741	107.875	3440.8
266.0	3046.8	4.542	0.00000	9.644	107.890	3446.9
267.0	3052.8	4.540	0.00000	9.547	107.905	3453.1
268.0	3058.8	4.539	0.00000	9.452	107.920	3459.2
269.0	3064.9	4.538	0.00000	9.357	107.935	3465.4
270.0	3071.0	4.537	0.00000	9.264	107.950	3471.6
271.0	3077.1	4.537	0.00000	9.170	107.965	3477.8
272.0	3083.2	4.536	0.00000	9.077	107.981	3484.1
273.0	3089.4	4.536	0.00000	8.983	107.996	3490.4
274.0	3095.6	4.535	0.00000	8.892	108.011	3496.7
275.0	3101.8	4.535	0.00000	8.800	108.026	3503.0
276.0	3108.0	4.535	0.00000	8.707	108.041	3509.4
277.0	3114.3	4.535	0.00000	8.617	108.057	3515.8
278.0	3120.6	4.536	0.00000	8.528	108.072	3522.2
279.0	3127.0	4.536	0.00000	8.439	108.088	3528.6
280.0	3133.3	4.536	0.00000	8.351	108.103	3535.1

TABLE XI (U)

TIME SEC	EARTH-VEL M/SEC	MACH	DYNPRES N/CM SQ	VEL-ELEV DEG	VEL-AZ DEG	SPACE-VEL M/SEC
281.0	3139.6	4.537	0.00000	8.262	108.118	3541.5
282.0	3146.0	4.538	0.00000	8.174	108.134	3548.0
283.0	3152.4	4.539	0.00000	8.086	108.149	3554.5
284.0	3158.8	4.539	0.00000	8.000	108.165	3561.0
285.0	3165.3	4.541	0.00000	7.916	108.181	3567.5
286.0	3171.7	4.543	0.00000	7.831	108.196	3574.0
287.0	3178.1	4.547	0.00000	7.745	108.212	3580.6
288.0	3184.6	4.551	0.00000	7.662	108.227	3587.2
289.0	3191.2	4.555	0.00000	7.579	108.243	3593.8
290.0	3197.7	4.558	0.00000	7.496	108.259	3600.4
291.0	3204.2	4.562	0.00000	7.413	108.274	3607.0
292.0	3210.8	4.566	0.00000	7.332	108.290	3613.7
293.0	3217.5	4.571	0.00000	7.251	108.306	3620.4
294.0	3224.1	4.575	0.00000	7.170	108.322	3627.1
295.0	3230.7	4.579	0.00000	7.090	108.338	3633.9
296.0	3237.4	4.583	0.00000	7.009	108.354	3640.6
297.0	3244.0	4.588	0.00000	6.931	108.370	3647.3
298.0	3250.7	4.592	0.00000	6.853	108.385	3654.1
299.0	3257.5	4.597	0.00000	6.775	108.401	3660.9
300.0	3264.2	4.601	0.00000	6.697	108.417	3667.7
301.0	3271.0	4.606	0.00000	6.619	108.433	3674.6
302.0	3277.8	4.611	0.00000	6.542	108.449	3681.5
303.0	3284.7	4.616	0.00000	6.466	108.465	3688.4
304.0	3291.5	4.621	0.00000	6.391	108.482	3695.3
305.0	3298.5	4.626	0.00000	6.315	108.498	3702.3
306.0	3305.4	4.631	0.00000	6.240	108.514	3709.3
307.0	3312.3	4.636	0.00000	6.165	108.530	3716.3
308.0	3319.3	4.642	0.00000	6.091	108.547	3723.4
309.0	3326.4	4.647	0.00000	6.018	108.563	3730.5
310.0	3333.4	4.652	0.00000	5.945	108.579	3737.6
311.0	3340.5	4.658	0.00000	5.872	108.596	3744.8
312.0	3347.6	4.664	0.00000	5.798	108.61	3752.0
313.0	3354.8	4.669	0.00000	5.726	108.629	3759.2
314.0	3361.9	4.675	0.00000	5.654	108.645	3766.4
315.0	3369.1	4.681	0.00000	5.582	108.662	3773.6
316.0	3376.3	4.687	0.00000	5.512	108.678	3780.9
317.0	3383.6	4.693	0.00000	5.441	108.695	3788.2
318.0	3390.8	4.699	0.00000	5.371	108.712	3795.5
319.0	3398.1	4.705	0.00000	5.302	108.728	3802.9
320.0	3405.5	4.711	0.00000	5.233	108.745	3810.2

TABLE XI (J)

TIME SEC	EARTH-VEL M/SEC	MACH	DYNPRES N/CM SQ	VEL-ELEV DEG	VEL-AZ DEG	SPACE-VEL M/SEC
321.0	3412.8	4.717	0.00000	5.165	108.762	3817.6
322.0	3420.1	4.724	0.00000	5.096	108.779	3825.0
323.0	3427.6	4.730	0.00000	5.029	108.795	3832.5
324.0	3435.0	4.737	0.00000	4.962	108.812	3840.0
325.0	3442.4	4.743	0.00000	4.895	108.829	3847.4
326.0	3449.9	4.750	0.00000	4.828	108.846	3854.9
327.0	3457.4	4.757	0.00000	4.762	108.863	3862.5
328.0	3465.0	4.763	0.00000	4.698	108.880	3870.1
329.0	3472.5	4.770	0.00000	4.632	108.897	3877.7
330.0	3480.1	4.777	0.00000	4.566	108.914	3885.3
331.0	3487.7	4.784	0.00000	4.502	108.931	3893.0
332.0	3495.4	4.791	0.00000	4.439	108.948	3900.7
333.0	3503.1	4.798	0.00000	4.376	108.965	3908.4
334.0	3510.8	4.806	0.00000	4.311	108.982	3916.2
335.0	3518.5	4.813	0.00000	4.248	108.999	3923.9
336.0	3526.2	4.820	0.00000	4.185	109.017	3931.7
337.0	3534.0	4.828	0.00000	4.125	109.034	3939.5
338.0	3541.8	4.835	0.00000	4.065	109.051	3947.4
339.0	3549.7	4.843	0.00000	4.004	109.068	3955.3
340.0	3557.5	4.850	0.00000	3.942	109.086	3963.1
341.0	3565.3	4.858	0.00000	3.881	109.103	3971.0
342.0	3573.3	4.865	0.00000	3.822	109.120	3979.0
343.0	3581.2	4.874	0.00000	3.764	109.138	3987.0
344.0	3589.2	4.882	0.00000	3.704	109.155	3995.0
345.0	3597.2	4.890	0.00000	3.646	109.173	4003.0
346.0	3605.2	4.898	0.00000	3.589	109.190	4011.1
347.0	3613.3	4.906	0.00000	3.530	109.208	4019.1
348.0	3621.4	4.914	0.00000	3.473	109.226	4027.3
349.0	3629.5	4.923	0.00000	3.417	109.243	4035.4
350.0	3637.6	4.932	0.00000	3.362	109.261	4043.5
351.0	3645.7	4.942	0.00000	3.305	109.279	4051.7
352.0	3653.9	4.951	0.00000	3.251	109.297	4059.9
353.0	3662.1	4.960	0.00000	3.196	109.314	4068.2
354.0	3670.4	4.969	0.00000	3.141	109.332	4076.4
355.0	3678.6	4.979	0.00000	3.085	109.350	4084.7
356.0	3686.9	4.988	0.00000	3.032	109.368	4093.0
357.0	3695.3	4.998	0.00000	2.979	109.386	4101.4
358.0	3703.6	5.007	0.00000	2.926	109.403	4109.8
359.0	3712.0	5.017	0.00000	2.873	109.421	4118.2
360.0	3720.4	5.027	0.00000	2.820	109.439	4126.6

TABLE XI (U)

TIME SEC	EARTH-VEL M/SEC	MACH	DYNPRES N/CM SQ	VEL-ELEV DEG	VEL-AZ DEG	SPACE-VEL M/SEC
361.0	3728.8	5.036	0.00000	2.768	109.458	4135.0
362.0	3737.3	5.046	0.00000	2.716	109.476	4143.5
363.0	3745.7	5.056	0.00000	2.665	109.493	4152.0
364.0	3754.3	5.066	0.00000	2.615	109.511	4160.5
365.0	3762.8	5.076	0.00000	2.564	109.529	4169.1
366.0	3771.4	5.086	0.00000	2.514	109.548	4177.7
367.0	3779.9	5.096	0.00000	2.465	109.566	4186.3
368.0	3788.6	5.106	0.00000	2.417	109.584	4194.9
369.0	3797.3	5.117	0.00000	2.368	109.602	4203.6
370.0	3806.0	5.127	0.00000	2.321	109.620	4212.3
371.0	3814.6	5.137	0.00000	2.272	109.638	4221.0
372.0	3823.3	5.147	0.00000	2.225	109.657	4229.7
373.0	3832.1	5.158	0.00000	2.178	109.675	4238.5
374.0	3840.9	5.168	0.00000	2.132	109.693	4247.3
375.0	3849.7	5.179	0.00000	2.086	109.711	4256.2
376.0	3858.6	5.190	0.00000	2.040	109.729	4265.0
377.0	3867.4	5.200	0.00000	1.995	109.748	4273.9
378.0	3876.3	5.211	0.00000	1.949	109.766	4282.8
379.0	3885.3	5.222	0.00000	1.905	109.785	4291.7
380.0	3894.3	5.233	0.00000	1.861	109.804	4300.7
381.0	3903.2	5.244	0.00000	1.817	109.823	4309.7
382.0	3912.2	5.255	0.00000	1.773	109.841	4318.7
383.0	3921.2	5.266	0.00000	1.729	109.859	4327.7
384.0	3930.3	5.277	0.00000	1.686	109.877	4336.8
385.0	3939.4	5.288	0.00000	1.644	109.896	4345.9
386.0	3948.5	5.299	0.00000	1.603	109.915	4355.1
387.0	3957.7	5.310	0.00000	1.560	109.933	4364.2
388.0	3966.8	5.322	0.00000	1.518	109.952	4373.4
389.0	3976.1	5.333	0.00000	1.477	109.971	4382.6
390.0	3985.3	5.345	0.00000	1.437	109.990	4391.9
391.0	3994.6	5.356	0.00000	1.396	110.009	4401.2
392.0	4003.9	5.368	0.00000	1.357	110.028	4410.5
393.0	4013.2	5.379	0.00000	1.317	110.047	4419.8
394.0	4022.6	5.391	0.00000	1.279	110.066	4429.2
395.0	4032.0	5.403	0.00000	1.241	110.084	4438.6
396.0	4041.4	5.415	0.00000	1.203	110.102	4448.0
397.0	4050.9	5.426	0.00000	1.164	110.121	4457.5
398.0	4060.3	5.438	0.00000	1.126	110.140	4466.9
399.0	4069.9	5.450	0.00000	1.089	110.159	4476.5
400.0	4079.5	5.463	0.00000	1.052	110.178	4486.1

TABLE XI (U)

TIME SEC	EARTH-VEL M/SEC	MACH	DYNPRES N/C <sup>4</sup> SQ	VEL-ELEV DEG	VEL-AZ DEG	SPACE-VEL M/SEC
401.0	4089.1	5.475	0.00000	1.016	110.197	4495.7
402.0	4098.7	5.487	0.00000	0.979	110.216	4505.3
403.0	4108.3	5.499	0.00000	0.943	110.235	4514.9
404.0	4118.0	5.511	0.00000	0.905	110.255	4524.6
405.0	4127.8	5.524	0.00000	0.870	110.274	4534.4
406.0	4137.6	5.536	0.00000	0.835	110.293	4544.2
407.0	4147.4	5.549	0.00000	0.799	110.312	4554.0
408.0	4157.2	5.562	0.00000	0.764	110.331	4563.8
409.0	4167.1	5.574	0.00000	0.730	110.349	4573.7
410.0	4177.0	5.587	0.00000	0.696	110.368	4583.6
411.0	4186.9	5.600	0.00000	0.662	110.388	4593.5
412.0	4196.9	5.613	0.00000	0.629	110.407	4603.5
413.0	4207.0	5.626	0.00000	0.595	110.426	4613.5
414.0	4217.0	5.639	0.00000	0.562	110.446	4623.6
415.0	4227.1	5.652	0.00000	0.529	110.465	4633.7
416.0	4237.2	5.665	0.00000	0.496	110.485	4643.8
417.0	4247.4	5.679	0.00000	0.464	110.504	4654.0
418.0	4257.6	5.692	0.00000	0.432	110.523	4664.2
419.0	4267.9	5.705	0.00000	0.400	110.543	4674.4
420.0	4278.1	5.719	0.00000	0.368	110.562	4684.7
421.0	4288.4	5.732	0.00000	0.338	110.582	4695.0
422.0	4298.9	5.746	0.00000	0.308	110.601	4705.3
423.0	4309.2	5.760	0.00000	0.278	110.621	4715.7
424.0	4319.7	5.773	0.00000	0.248	110.640	4726.1
425.0	4330.0	5.787	0.00000	0.219	110.660	4736.5
426.0	4340.5	5.801	0.00000	0.189	110.679	4747.0
427.0	4351.0	5.815	0.00000	0.159	110.699	4757.6
428.0	4361.6	5.829	0.00000	0.131	110.719	4768.1
429.0	4372.2	5.843	0.00000	0.102	110.738	4778.7
430.0	4382.9	5.857	0.00000	0.074	110.757	4789.3
431.0	4393.5	5.872	0.00000	0.047	110.776	4800.0
432.0	4404.2	5.885	0.00000	0.019	110.796	4910.7
433.	4414.9	5.900	0.00000	-0.009	110.816	4821.4
434.0	4425.7	5.915	0.00000	-0.036	110.836	4832.2
435.0	4436.6	5.929	0.00000	-0.063	110.855	4843.0
436.0	4447.4	5.944	0.00000	-0.090	110.875	4853.9
437.0	4458.2	5.959	0.00000	-0.117	110.895	4864.7
438.0	4469.2	5.973	0.00000	-0.142	110.915	4875.6
439.0	4480.1	5.988	0.00000	-0.167	110.935	4886.5
440.0	4491.1	6.003	0.00000	-0.192	110.955	4897.5

TABLE XI (U)

TIME SEC	EARTH-VEL M/SEC	MACH	DYNPRES N/CM SQ	VEL-ELEV DEG	VEL-AZ DEG	SPACE-VEL M/SEC
441.0	4502.1	6.018	0.00000	-0.218	110.975	4908.5
442.0	4513.1	6.033	0.00000	-0.242	110.995	4919.5
443.0	4524.2	6.048	0.00000	-0.266	111.015	4930.6
444.0	4535.4	6.063	0.00000	-0.291	111.035	4941.8
445.0	4546.5	6.078	0.00000	-0.314	111.055	4952.9
446.0	4557.7	6.094	0.00000	-0.337	111.075	4964.1
447.0	4568.9	6.109	0.00000	-0.358	111.095	4975.3
448.0	4580.2	6.124	0.00000	-0.380	111.115	4986.5
449.0	4591.5	6.140	0.00000	-0.402	111.135	4997.8
450.0	4602.8	6.156	0.00000	-0.424	111.155	5009.1
451.0	4614.1	6.171	0.00000	-0.444	111.175	5020.4
452.0	4625.5	6.187	0.00000	-0.465	111.195	5031.8
453.0	4636.9	6.203	0.00000	-0.486	111.215	5043.3
454.0	4648.4	6.218	0.00000	-0.506	111.235	5054.7
455.0	4659.8	6.234	0.00000	-0.525	111.255	5066.1
456.0	4671.4	6.250	0.00000	-0.544	111.275	5077.7
457.0	4682.9	6.266	0.00000	-0.562	111.295	5089.2
458.0	4694.6	6.282	0.00000	-0.581	111.316	5100.8
459.0	4705.2	6.299	0.00000	-0.600	111.336	5112.5
460.0	4717.9	6.315	0.00000	-0.618	111.357	5124.1
461.0	4729.6	6.331	0.00000	-0.635	111.377	5135.8
462.0	4741.3	6.347	0.00000	-0.652	111.397	5147.5
463.0	4753.1	6.364	0.00000	-0.668	111.418	5159.3
464.0	4765.0	6.381	0.00000	-0.685	111.439	5171.2
465.0	4775.8	6.397	0.00000	-0.702	111.460	5183.0
466.0	4788.7	6.414	0.00000	-0.718	111.481	5194.9
467.0	4800.6	6.430	0.00000	-0.735	111.501	5206.8
468.0	4812.6	6.447	0.00000	-0.749	111.522	5218.8
469.0	4824.7	6.464	0.00000	-0.764	111.542	5230.8
470.0	4836.7	6.481	0.00000	-0.779	111.563	5242.9
471.0	4848.9	6.498	0.00000	-0.794	111.583	5255.0
472.0	4861.0	6.515	0.00000	-0.808	111.604	5267.1
473.0	4873.2	6.533	0.00000	-0.822	111.625	5279.3
474.0	4885.5	6.550	0.00000	-0.835	111.646	5291.6
475.0	4897.8	6.567	0.00000	-0.849	111.666	5303.9
476.0	4910.1	6.585	0.00000	-0.863	111.686	5316.2
477.0	4922.5	6.602	0.00000	-0.876	111.707	5328.5
478.0	4934.9	6.620	0.00000	-0.889	111.727	5340.9
479.0	4947.4	6.638	0.00000	-0.901	111.748	5353.4
480.0	4959.8	6.655	0.00000	-0.914	111.769	5365.8

TABLE XI (U)

TIME SEC	EARTH-VFL M/SEC	MACH	DYNPRES N/CM SQ	VEL-ELEV DEG	VEL-AZ DEG	SPACE-VEL M/SEC
481.0	4972.4	6.673	0.00000	-0.926	111.790	5378.3
482.0	4985.0	6.691	0.00000	-0.937	111.811	5390.9
483.0	4997.6	6.709	0.00000	-0.948	111.832	5403.6
484.0	5010.4	6.727	0.00000	-0.960	111.853	5416.3
485.0	5023.2	6.746	0.00000	-0.971	111.874	5429.1
486.0	5035.9	6.764	0.00000	-0.992	111.895	5441.8
487.0	5048.8	6.782	0.00000	-0.992	111.916	5454.7
488.0	5061.7	6.801	0.00000	-1.002	111.937	5467.6
489.0	5074.6	6.819	0.00000	-1.012	111.958	5480.5
490.0	5087.6	6.838	0.00000	-1.022	111.979	5493.5
491.0	5100.6	6.857	0.00000	-1.032	112.000	5506.5
492.0	5113.7	6.875	0.00000	-1.041	112.021	5519.5
493.0	5126.8	6.894	0.00000	-1.050	112.042	5532.7
494.0	5140.0	6.913	0.00000	-1.060	112.064	5545.8
495.0	5153.2	6.932	0.00000	-1.068	112.085	5559.0
496.0	5166.4	6.951	0.00000	-1.076	112.106	5572.2
497.0	5179.7	6.971	0.00000	-1.084	112.127	5585.5
498.0	5193.1	6.990	0.00000	-1.092	112.149	5598.8
499.0	5206.4	7.009	0.00000	-1.099	112.170	5612.2
500.0	5219.9	7.029	0.00000	-1.106	112.191	5625.6
501.0	5233.4	7.048	0.00000	-1.113	112.213	5639.1
502.0	5246.9	7.068	0.00000	-1.119	112.234	5652.6
503.0	5260.4	7.087	0.00000	-1.124	112.255	5666.1
504.0	5274.1	7.107	0.00000	-1.129	112.277	5679.7
505.0	5287.8	7.127	0.00000	-1.135	112.298	5693.4
506.0	5301.5	7.147	0.00000	-1.141	112.320	5707.1
507.0	5315.2	7.167	0.00000	-1.145	112.341	5720.9
508.0	5329.0	7.187	0.00000	-1.150	112.363	5734.6
509.0	5342.9	7.207	0.00000	-1.154	112.384	5748.5
510.0	5355.8	7.227	0.00000	-1.158	112.406	5762.4
511.0	5370.8	7.248	0.00000	-1.162	112.428	5776.4
512.0	5384.9	7.269	0.00000	-1.166	112.449	5790.4
513.0	5398.9	7.289	0.00000	-1.169	112.471	5804.5
514.0	5413.1	7.309	0.00000	-1.171	112.493	5818.6
515.0	5427.2	7.330	0.00000	-1.174	112.515	5832.7
516.0	5441.1	7.351	0.00000	-1.175	112.537	5846.9
517.0	5455.7	7.372	0.00000	-1.179	112.559	5861.2
518.0	5470.1	7.393	0.00000	-1.181	112.581	5875.5
519.0	5484.5	7.414	0.00000	-1.183	112.603	5889.9
520.0	5499.0	7.435	0.00000	-1.184	112.624	5904.4

TABLE XI (J)

TIME SEC	EARTH-VEL M/SEC	MACH	DYNPRES N/CM SQ	VEL-ELEV DEG	VEL-AZ DEG	SPACE-VEL M/SEC
521.0	5513.5	7.456	0.00000	-1.185	112.646	5918.9
522.0	5528.1	7.478	0.00000	-1.186	112.668	5933.5
523.0	5542.8	7.499	0.00000	-1.188	112.690	5948.2
524.0	5557.4	7.521	0.00000	-1.188	112.712	5962.8
525.0	5572.1	7.542	0.00000	-1.189	112.734	5977.5
526.0	5585.9	7.564	0.00000	-1.189	112.756	5992.3
527.0	5601.8	7.586	0.00000	-1.188	112.778	6007.2
528.0	5615.7	7.608	0.00000	-1.189	112.800	6022.1
529.0	5631.7	7.630	0.00000	-1.187	112.823	6037.0
530.0	5645.7	7.652	0.00000	-1.185	112.845	6052.0
531.0	5661.8	7.674	0.00000	-1.183	112.868	6067.1
532.0	5675.9	7.696	0.00000	-1.181	112.890	6082.2
533.0	5692.0	7.718	0.00000	-1.179	112.912	6097.3
534.0	5707.2	7.741	0.00000	-1.177	112.934	6112.5
535.0	5722.5	7.763	0.00000	-1.175	112.955	6127.8
536.0	5737.9	7.786	0.00000	-1.172	112.977	6143.1
537.0	5752.3	7.809	0.00000	-1.168	113.000	6158.5
538.0	5768.8	7.832	0.00000	-1.165	113.022	6174.0
539.0	5784.3	7.856	0.00000	-1.161	113.044	6189.5
540.0	5799.9	7.879	0.00000	-1.156	113.067	6205.1
541.0	5815.6	7.903	0.00000	-1.153	113.089	6220.7
542.0	5831.3	7.927	0.00000	-1.148	113.112	6236.4
543.0	5847.0	7.951	0.00000	-1.143	113.134	6252.1
544.0	5862.8	7.975	0.00000	-1.138	113.156	6267.9
545.0	5878.7	7.999	0.00000	-1.132	113.179	6283.8
546.0	5894.6	8.023	0.00000	-1.126	113.202	6299.7
547.0	5910.6	8.047	0.00000	-1.120	113.225	6315.7
548.0	5926.7	8.072	0.00000	-1.114	113.248	6331.8
549.0	5942.8	8.096	0.00000	-1.108	113.270	6347.9
550.0	5959.0	8.121	0.00000	-1.101	113.292	6364.0
551.0	5975.3	8.146	0.00000	-1.094	113.315	6380.3
552.0	5991.7	8.171	0.00000	-1.087	113.337	6396.7
553.0	6008.0	8.196	0.00000	-1.080	113.360	6413.0
554.0	6024.4	8.220	0.00000	-1.071	113.383	6429.4
555.0	6040.9	8.245	0.00000	-1.063	113.406	6445.9
556.0	6057.5	8.271	0.00000	-1.054	113.428	6462.5
557.0	6074.2	8.296	0.00000	-1.046	113.451	6479.2
558.0	6090.9	8.321	0.00000	-1.037	113.474	6495.9
559.0	6107.8	8.347	0.00000	-1.028	113.497	6512.7
560.0	6124.7	8.373	0.00000	-1.018	113.520	6529.6

TABLE XI (U)

TIME SEC	EARTH-VEL M/SEC	MACH	DYNPRES N/LM SQ	VEL-ELEV DEG	VEL-AZ DEG	SPACE-VEL M/SEC
561.0	6141.7	8.398	0.00000	-1.009	113.543	6546.6
562.0	6158.7	8.424	0.00000	-0.999	113.565	6563.6
563.0	6175.9	8.450	0.00000	-0.989	113.588	6580.8
564.0	6193.1	8.476	0.00000	-0.979	113.611	6598.0
565.0	6210.4	8.502	0.00000	-0.969	113.634	6615.3
566.0	6227.8	8.529	0.00000	-0.958	113.658	6632.6
567.0	6245.2	8.555	0.00000	-0.947	113.681	6650.0
568.0	6262.8	8.582	0.00000	-0.936	113.704	6667.6
569.0	6280.4	8.608	0.00000	-0.925	113.727	6685.2
570.0	6298.1	8.635	0.00000	-0.914	113.750	6702.9
571.0	6315.9	8.662	0.00000	-0.902	113.773	6720.7
572.0	6333.6	8.688	0.00000	-0.891	113.797	6738.4
573.0	6351.5	8.715	0.00000	-0.879	113.820	6756.3
574.0	6369.5	8.742	0.00000	-0.867	113.844	6774.2
575.0	6387.6	8.770	0.00000	-0.855	113.867	6792.4
576.0	6405.8	8.797	0.00000	-0.843	113.890	6810.5
577.0	6424.0	8.824	0.00000	-0.830	113.913	6828.7
578.0	6442.3	8.852	0.00000	-0.817	113.936	6847.0
579.0	6460.7	8.879	0.00000	-0.804	113.959	6865.4
580.0	6479.2	8.907	0.00000	-0.791	113.983	6883.9
581.0	6497.8	8.935	0.00000	-0.776	114.006	6902.5
582.0	6515.5	8.963	0.00000	-0.762	114.030	6921.1
583.0	6535.2	8.991	0.00000	-0.748	114.053	6939.9
584.0	6554.1	9.019	0.00000	-0.733	114.077	6958.7
585.0	6573.0	9.047	0.00000	-0.718	114.100	6977.6
586.0	6592.0	9.075	0.00000	-0.703	114.124	6996.6
587.0	6611.1	9.104	0.00000	-0.687	114.148	7015.7
588.0	6630.2	9.132	0.00000	-0.671	114.171	7034.9
589.0	6649.5	9.161	0.00000	-0.655	114.195	7054.1
590.0	6668.9	9.189	0.00000	-0.639	114.219	7073.5
591.0	6688.3	9.218	0.00000	-0.622	114.242	7092.9
592.0	6707.8	9.247	0.00000	-0.606	114.266	7112.3
593.0	6727.4	9.276	0.00000	-0.588	114.290	7132.0
594.0	6747.1	9.305	0.00000	-0.570	114.314	7151.7
595.0	6766.8	9.334	0.00000	-0.552	114.337	7171.4
596.0	6785.6	9.363	0.00000	-0.535	114.361	7191.2
597.0	6806.6	9.392	0.00000	-0.516	114.385	7211.2
598.0	6825.7	9.422	0.00000	-0.498	114.409	7231.3
599.0	6846.9	9.451	0.00000	-0.480	114.433	7251.4
600.0	6867.1	9.481	0.00000	-0.461	114.457	7271.6

TABLE XI (U)

TIME SEC	EARTH-VFL M/SEC	MACH	DYNPRES N/CM SQ	VEL-ELEV DEG	VEL-AZ DEG	SPACE-VEL M/SEC
601.0	6887.5	9.510	0.00000	-0.442	114.481	7292.0
602.0	6908.0	9.540	0.00000	-0.422	114.505	7312.5
603.0	6928.6	9.570	0.00000	-0.402	114.529	7333.1
604.0	6949.2	9.600	0.00000	-0.382	114.553	7353.7
605.0	6969.9	9.630	0.00000	-0.362	114.577	7374.4
606.0	6990.7	9.660	0.00000	-0.342	114.601	7395.2
607.0	7011.7	9.690	0.00000	-0.322	114.625	7416.2
608.0	7032.8	9.720	0.00000	-0.301	114.650	7437.2
609.0	7053.9	9.751	0.00000	-0.279	114.674	7458.4
610.0	7075.3	9.781	0.00000	-0.258	114.698	7479.7
611.0	7096.7	9.812	0.00000	-0.237	114.722	7501.1
612.0	7118.1	9.843	0.00000	-0.215	114.746	7522.5
613.0	7139.7	9.873	0.00000	-0.193	114.770	7544.2
614.0	7161.5	9.904	0.00000	-0.171	114.794	7565.9
615.0	7183.4	9.935	0.00000	-0.148	114.819	7587.8
616.0	7205.3	9.966	0.00000	-0.125	114.843	7609.7
617.0	7227.4	9.997	0.00000	-0.102	114.868	7631.8
618.0	7249.6	10.028	0.00000	-0.079	114.892	7654.0
619.0	7271.8	10.060	0.00000	-0.056	114.916	7676.2
620.0	7294.0	10.091	0.00000	-0.033	114.941	7698.4
621.0	7316.5	10.122	0.00000	-0.010	114.965	7720.9
622.0	7339.2	10.154	0.00000	0.014	114.989	7743.5
623.0	7361.9	10.195	0.00000	0.038	115.014	7766.2
624.0	7384.8	10.217	0.00000	0.063	115.039	7789.2

## S-IV CUTOFF SIGNAL

624.860	7404.6	10.244	0.00000	0.084	115.060	7808.9
625.0	7407.3	10.248	0.00000	0.087	115.063	7811.6
626.0	7407.7	10.248	0.00000	0.088	115.090	7812.0
627.0	7408.0	10.249	0.00000	0.088	115.117	7812.3
628.0	7407.7	10.248	0.00000	0.087	115.143	7812.0
629.0	7407.7	10.248	0.00000	0.087	115.170	7812.0
630.0	7407.6	10.248	0.00000	0.088	115.196	7812.0
631.0	7407.7	10.248	0.00000	0.088	115.223	7812.0
632.0	7407.7	10.248	0.00000	0.088	115.250	7812.0
633.0	7407.7	10.247	0.00000	0.089	115.276	7812.0
634.0	7407.6	10.247	0.00000	0.089	115.302	7812.0

## INSERTION

634.860	7407.6	10.247	0.00000	0.089	115.325	7812.0
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## (U) APPENDIX

The origin of the Earth-Fixed Cartesian Coordinate System employed for calculations of this trajectory is the projection of the center of gravity of the complete vehicle at first motion on the Fischer Ellipsoid of 1960.

The X-Z plane is tangent to the reference ellipsoid at the origin of the coordinate system. The positive Z-axis is oriented in the flight azimuth direction,  $105^{\circ}$  E of N. The Y-axis is normal to the X-Z plane and is positive above the origin. The Z-axis is normal to the X-Y plane and is in a right handed relation with the X, Y-axis, the positive direction is  $195^{\circ}$  E of N. The origin of this earth-fixed system rotates with an angular velocity identical to that of the earth. The earth-fixed coordinate system is shown in Figure 20.

The Space-Fixed Coordinate System is parallel to the earth-fixed system described above at the instant of launch; however, the origin of this system, which is at the initial center of gravity of the vehicle, and its orientation remains fixed in space.

Altitude, range, earth-centered distance, latitude, longitude, and azimuth, elevation, and magnitude of earth-fixed velocity vector are given for the Geographic Coordinate System. The subvehicle point is defined as the intersection of the radius vector from the vehicle to the center of the earth ( $R$ ) and the reference ellipsoid. Altitude is the distance from the subvehicle point to the center of gravity of the vehicle.

The longitude and geodetic latitude refer to the subvehicle point. The local horizontal plane is defined as the plane perpendicular to the radius vector from the vehicle to the center of the earth. Azimuth is the angle between the projection of the velocity vector into the local horizontal plane and the north direction in this plane. Elevation is the angle between the velocity vector and the local horizontal plane and is positive above the horizontal plane.

Range is, to a high degree of approximation, the shortest distance along the reference ellipsoid between the launch site and the subvehicle point. The earth model used for all the calculation except range was the Fischer Ellipsoid of 1960. The range given in this report was

computed by replacing the ellipsoid with a sphere of an appropriate radius. The equation used to compute this range is as follows:

$$\text{Range} = \frac{1}{2} (r_o + r_t) R_a$$

where:  $r_o$  = radius of earth at launch site

$r_t$  = radius of earth at subvehicle point

$R_a$  = angle between the two radii ( radians)

The geographic coordinate system is shown in Figure 21.

(U) REFERENCES

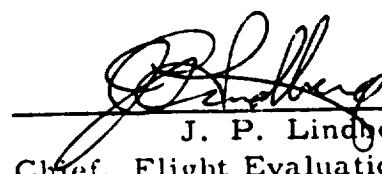
1. Stone, Lloyd O., "SA-6 Predicted Standard Trajectory and Dispersion Analysis," R-AERO-FM-4-64, dated May 5, 1964 (C).
2. Sheats, John P., "Methods For Establishing a Launch Phase Trajectory," MTP-AERO-63-5, dated January 11, 1963 (U).
3. Sheats, John P. and Haussler, Jonathan B., "A Technique For Calculating Smoothing and Differentiation Coefficients," MTP-AERO-62-71, dated September 26, 1962 (U).
4. Sullivan, D. O., McNeil, D. O., and Harmon, W. H., "Rigid Body Study of Control, Separation, and Lift-Off For SA-6 Vehicle," NASA TM X-53041, dated May 1, 1964 (C).
5. Flight Evaluation Working Group, "Results of the Sixth Saturn I Launch Vehicle Test Flight," MPR-SAT-FE-64-16, dated August 7, 1964 (C).
6. Goddard Space Flight Center, "Computing Notes on the Saturn Mission (SA-6)," X-554-64-166, dated June 18, 1964 (U).

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### SATURN SA-6 POSTFLIGHT TRAJECTORY (U)

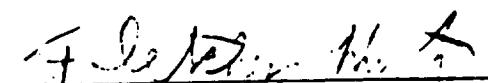
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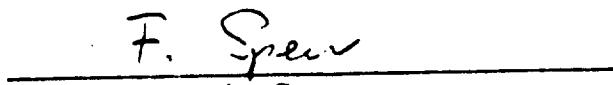
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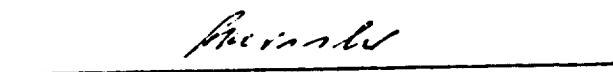
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